amateur radio

VOL. 45, No. 1 JANUARY 1977

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COVER PHOTO

Pictured is Alf Chandler VK3LC. Alf is well known for his work as the WIA Federal Intruder Watch Co-ordinator since 1972. He is also the IARU Region 3 Monitoring Service Co-ordinator since 1975. Alf was first licensed in 1925 as OA3WH then later as VK3WH. In 1955 he became VK3LC. His long and varied interest in Amateur Radio includes: Sec. Moorabbin and District Radio Club, 1960-61; AR Committee and Circulation Manager, 1963-70; Mag Pubs Manager, 1970-72.

Photograph by Reg Gouge.

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amateur radio

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QSP THE NOVICE THEORY EXAM

It is now some time since the announcement of the introduction of the Novice grade of licence.

After many delays we have now reached the stage where two examinations have been held. It is therefore rather disappointing to note from many reports now received that the standard of these examinations appears to have been set at a level not much below that of the AOCP theory exam.

If the concept of the Novice grade is to succeed, and we want it to succeed, the examination standard must be set at such a level to be achievable by those for whom we believed the grade was intended and not just for near-miss AOCP candidates.

The Executive is pursuing this matter.

D. A. WARDLAW, VK3ADW
Federal President. ■

QSP

DENTAL PROBES
Dentists use numerous "dental probes" for probing around patients' mouths. If an end breaks off they are usually discarded. Being made of strong stainless steel they are particularly useful for lifting components from PCB's or around tube sockets when the solder is molten.

VK3ASC

HEIGHT RESTRICTIONS ON TOWERS — USA
The comment printed on page 4 of AR Aug '76 as extracted from Worldradio News of April has brought out a comment from ARRL that there is in effect no restriction, under FCC Rules and Regulations, on the height of amateur antennas, except for those which would exceed 200 feet above average terrain, or those which are close to airports. In the latter case it would be necessary to file special papers.

DIVISIONAL BROADCASTS
Please amend your list on page 3 of Nov AR in respect of VK1 Division to read —
Time. 10,00 h UTC.

VK2 VHF FIELD DAY
A reminder — The VK2 VHF Group's mid-summer field day will be held from 12.00h ESST Sat 29th January to 14.00h ESST on Mon 31st Jan. Write to WIC, 14 Atchison Street, Crows Nest, NSW 2065, for details and enclose s.a.s.e.

1977 FEDERAL CONVENTION
Now is the time to prepare and submit to your Divisional Council agenda items for the 1977 Federal Convention to be held in Melbourne from 23rd to 25th April.

EDUCATION COMMITTEE
The Committee would welcome comments, criticisms (documented) and constructive advice regarding the Novice examination papers set for the November examinations in Theory, Regulations and Morse.

A syllabus for the Novice Theory examination has been prepared and will be published as early as possible after submission to the RFMD.

MALAYSIA REPEATER
The Sept issue of the MARTS newsletter has the news that their Frequency Assignment Committee has approved the use of frequencies 147.9 MHz output and 147.3 MHz input for the proposed repeater at Ulu Kali, max power 50W, emission 18F3. The same newsletter also carried information that Malaysian amateurs may now use RTTY.

PREFIXES
Radio Communication Nov '76 reports that the ITU has allocated the callsign series S7A to S7Z to the Republic of the Seychelles as from its date of independence.

1977 SUBSCRIPTION RATES
The following are the known subscription rates approved by Divisions for 1977. Items marked * were still to be confirmed when this was written.

Members are reminded to read their subscription notices and to send the amounts direct to the Executive office, PO Box 150, Toorak Vic 3142, as soon as possible to avoid the automatic stoppage of AR owing to becoming unfinancial and the consequences which will arise in the listing for the 1977 Call Book. **Please do not wait until a Final Notice has to be mailed to you.** Sending out Final Notices has become a considerable extra expense to the Institute in both time and money. In a membership society this could be construed as unthoughtful and unfair to the many, many members who do pay in good time.

1977 RATES

	$	
VK1	21.00	All grades
VK2	20.00	FC
	18.00	AT
	15.00	Students (on proof)
	10.00	Pensioners (proven)
	10.00	Family (no AR)
VK3	23.00	FC
	20.00	AT
	14.00	Students (on proof)
	13.00	Pensioners
	15.80	F or C family (no AR)
	12.80	A or T family (no AR)
VK4	20.00	F
	20.00	A
	18.50	C
	18.50	T
	13.00	Pensioners
	7.50	Students (on proof)
VK5	20.50	F
	19.00	ACT
	9.00	Pensioners and Students
	2.00*	Junior Students (no AR)
VK6	20.00	FC
	19.00	AT
	12.00	Pensioners and Students
VK7	17.00	FACT
	10.00	Pensioners and Students

New members, joining fees VK2—$2.00, VK7—$1.00.

Federal dues included in the above rates are:— EXEC $7.50, IARU $0.30, AR $7.20.

Explanation of Symbols:
F = Full member (city)
A = Associate member (city)
C = Full member (country)
T = Associate member (country)
G = Pensioners
S = Students
X = Sundries, no AR.

END OF ANOTHER ERA

Due to other commitments, Bill Roper VK3ARZ has reluctantly found it necessary to resign from the position of Editor of Amateur Radio magazine as from 1.12.1976.

Bill has been associated with AR for many years, more particularly as Editor since February, 1972.

His guidance and knowledge will be greatly missed by the Publications Committee and Editorial Staff.

In grateful appreciation of his tireless efforts, the Executive and everyone associated with the production of AR wish Bill all the best for the future.

WIANEWS

A great number of different matters were discussed at the Executive Meeting in November.

Here are some of the items so as to give you a glimpse of what went on —

1977 Call Book progress.
Input of non-members to EDP for the Call Book.
Task priorities — EDP and subscriptions processing.
Review of recruiting position.
Need for revision of membership proposal forms vis-a-vis Div. Constitutions.
Car stickers — Slogans
Badges
WICEN
WICEN armbands.
Services personnel, amateur restrictions.
Reminders to RFMD.
Financial review.
Establishment of staff superannuation fund.
Club subscription rates.
Students' subscription rates.
1977 subscription rates.
Approval of accounts.

These items are merely those listed under matters arising from previous minutes and financial matters. This is not at all an unusual array of items.

NOVICE EXAMINATION

Complaints had arrived about the unnecessarily high level of the November Novice Theory examination. Since no copy of the paper was available for inspection it was not possible, only a few days after the event, to arrive at any conclusions.

One correspondent did however write to say that on the information available to him many of the questions were those which were supplied by the Institute to RFMD back in September. As reported in WIANEWS in Nov. AR page 4 the multi-choice questions submitted by the Institute related to the AOCP Theory paper. This was at the request of the RFMD.

Sample Novice theory questions were not submitted because there had been no request for these.

Preparation of a syllabus for the Novice theory examination is well advanced.

POSTAL MOTIONS

The Executive approved the issue of the following motions for voting by the Federal Council:—

"76.20.02. That this Institute, at this time, does not support the concept of an amateur service licence or permit of a level below that of the Novice grade" and
"76.20.03. That the Institute adopts the below-listed frequencies as WICEN net frequencies as may be required from time to time and requests all amateurs to keep these frequencies clear for all properly identified WICEN communications purposes:—

Primary — 3600, 7050 and 14100 kHz.
Secondary — for CW 3575, 7025, 14075 kHz
phone 3625, 7075, 14124 kHz.

WICEN

The Federal WICEN Co-ordinator suggested that a Co-ordinators' meeting now appeared desirable. Executive made a number of recommendations on this matter to the Divisions.

The Federal President is making arrangements to visit the Sydney/Gosford areas on an official visit over the week-end of 19th/20th February next. He will take with him the videotape of the G6CJ aerial circus. Many members would be interested in viewing this. ■

ALL JAPAN HAMVENTION

JARL 50th ANNIVERSARY

The Japan Amateur Radio League celebrated its 50th anniversary from 23rd to 26th September, 1976.

Michael Owen VK3K1, the immediate Past President of the W.I.A., and a director of the IARU Region 3 Association, represented the Association and the W.I.A.

Here he is shown presenting an opal rock, shaped in the map of Australia and mounted on a plaque, to the President of JARL, Shoza Hara, JA1AN.

The presentation took place on the 23rd September at Chinzan-so, Tokyo, and was followed by a dinner attended by their Imperial Highnesses, Prince Yoshihito Mikasa and Princess Hitachi.

ADDRESS BY MICHAEL OWEN, VK3KI AT THE COMMEMORATIVE DINNER PARTY AT CHINZAN-SO, TOKYO, JAPAN ON FRIDAY, 24th SEPTEMBER, 1976

"In celebrating its 50th Anniversary the Japan Amateur Radio League has, quite naturally, paid special attention to the past.

But in celebrating the past 50 years may I suggest that we should also look to the next 50 years.

In 1979 in Geneva the representatives of all of the countries of the world will meet and will review the bands allocated to each Service, including the Amateur Service.

There are two very important things that we should, I suggest, remember.

The first is that each country has only one vote. Japan has one vote. So has Australia. But so also has Tonga and Nauru.

The second thing that we should remember is that there are over 300,000 Amateurs in your country. The next largest amateur population in our Region is in Australia where there are only 6,000 licensed Amateurs.

Perhaps we should also remember that our Region, which has 37 votes at the conference in 1979, extends from Iran to Tonga — half the globe.

Our future is not secure. The Amateurs of the world are not the only people seeking to preserve and indeed expand their bands. We must justify our position. We face particular difficulties in our Region — we must remember that there are some countries where there are few Amateurs and other countries where, perhaps for security reasons, Amateur Radio is not permitted. Indeed, in some countries it is treated with the greatest suspicion.

I meet with you on my return from Geneva. There an International Working Group called together by the President of the International Amateur Radio Union, VE3CJ, has been attempting to formulate an IARU paper that we hope will help to guide the smaller Amateur Societies that we must rely on to present the case for Amateur Radio to their countries.

What do we say is the reason why the Amateur Service has valid and justified requirements for bands?

We suggest that we, the Amateurs of our part of the world, can put our case this way —

The Amateur Service is global; the needs of Amateurs cannot be judged by any country looking only at the narrow confines of that country. The unique contribution of the Amateur Service to international goodwill, training and education is at the heart of its contribution to both the national and international interest.

Your League has recognised the challenge of the conference in 1979. It has generously supported the Region 3 Association. Your President, Shozo Hara, JA1AN, was present at the World Conference in Miami, Florida. Your Society publishes, on behalf of the Region 3 Association, the Bulletin of our Association. We all remember with pleasure the second conference of the Association held in Tokyo.

By this support there is a strong regional organization of national societies.

The IARU and the regional organizations cannot ordinarily approach the government officials of any country directly for to do so could amount to an outside interference with the affairs of that country and could be counter-productive.

The Amateurs of the world must speak with one voice. Through the International Amateur Radio Union and through the three regional societies of the members of the International Amateur Radio Union, I believe we can achieve that common voice.

In our Region, Region 3, we have unique and special problems. With the support of JARL and the other Societies in our Region we can, I believe, effectively present our case.

On behalf of the Directors of the IARU Region 3 Association and the Secretary, David Rankin, and I am sure on behalf of all of the member societies, may I express our most sincere congratulations on your 50th Anniversary and with your support look forward to the next 50 years of our great international understanding."

TRANSCRIPT OF ADDRESS BY MICHAEL OWEN ON SUNDAY, 26th SEPTEMBER, 1976, AT THE ALL JAPAN HAMVENTION AT GREEN PARK, ASAGIRI HEIGHTS, JAPAN

"Your Imperial Highness,

Mr. Hara,

President of the All Japan Hamvention and the Japanese Amateur Radio League,

Ladies and Gentlemen,

The presence of Your Imperial Highness is a very great honour for amateur Radio and highlights the importance of this occasion.

Overseas visitors from the United States of America, the United Kingdom, New Zealand, Thailand, Korea, France, Germany, Sri Lanka and Australia have been honoured to share in the celebrations of the 50th Anniversary of JARL.

I cannot find words to express our gratitude for your kindness to us. I am sure that the last few days will be an experience that none of us will ever forget.

We have thought of the past, talked of the future and enjoyed ourselves. What could be better or more appropriate?

To all of you who have been so good to us and to you, Mr. Hara, on behalf of the visitors from overseas, I thank you, and to all of the amateurs of Japan, I assure you we look forward to the next exciting 50 years of amateur radio in your country." ■

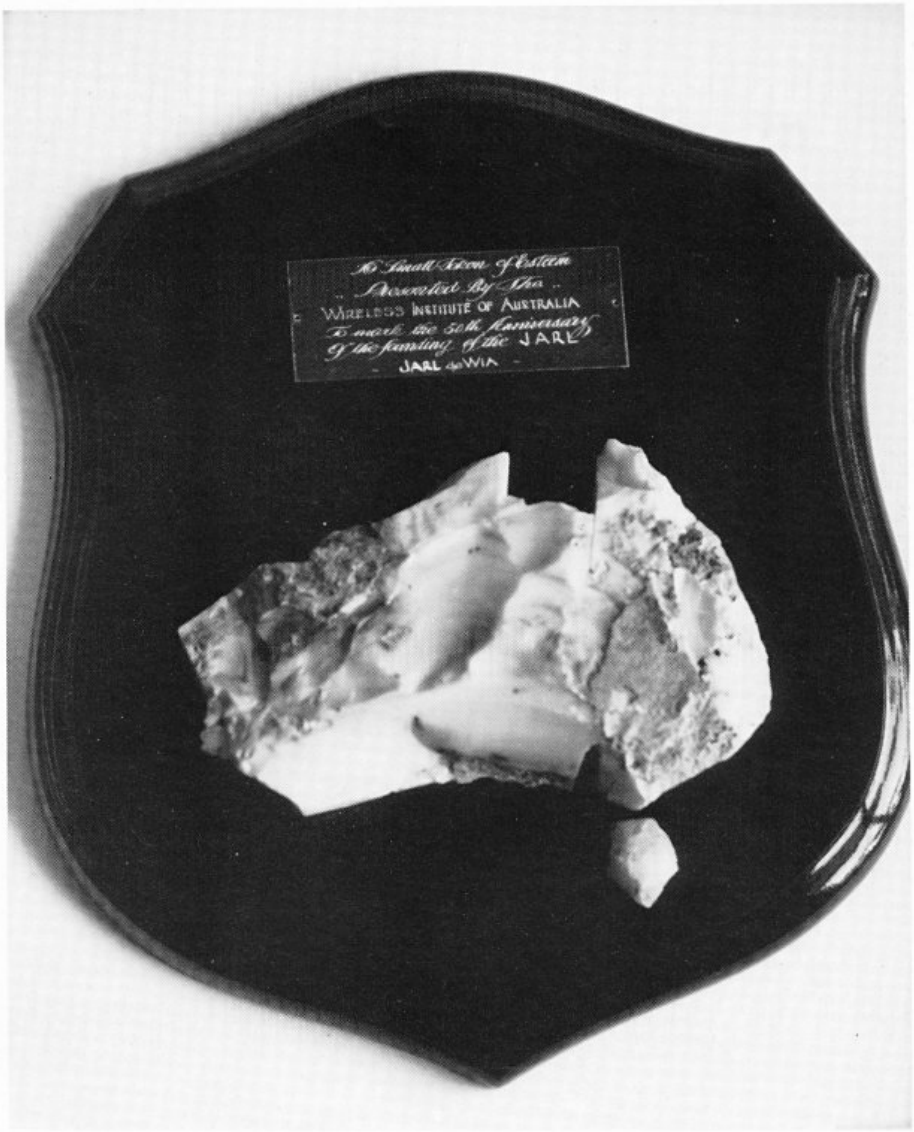

PHOTO No. 1

PHOTO No. 1

Mock up of the shield presented to JARL in Tokyo by Michael Owen VK3KI on behalf of the WIA.

PHOTO No. 2

VK3KI presenting the shield to JARL President Shozo Hara JA1AN at Chinzon-so, Tokyo on 23rd September, 1976.

PHOTO No. 3

H.I.H. Prince Yoshihito Mikasa being welcomed by VK3KI on arriving at the Japan Hamvention at Green Park, Asagiri Heights.

PHOTO No. 2

PHOTO No. 3

DICK SMITH FOR ALL AMATEUR RADIO EQUIPMENT..

HF EQUIPMENT

Cat D-2520	Kenwood TS520D transceiver, 80 – 10m, SSB/CW. 240V & 12V operation.	$699.00
Cat D-5201	Kenwood VFO-520 remote VFO for TS520 transceiver.	$120.00
Cat D-5202	Kenwood SP-520 remote speaker for TS520 transceiver. (Also for TS820 - see below)	$42.00
Cat D-2110	Kenwood TS820 transceiver, 160 – 10m, SSB/CW/FSK.	$990.00
Cat D-2111	Kenwood VFO-820 remote VFO for TS820 transceiver.	$164.00
Cat D-2112	Kenwood DG1 digital display (option for the TS820 transceiver)	$185.00
Cat D-2530	Atlas 210 transceiver, 80 – 10m, 200W input, SSB & CW.	$599.00
Cat D-4306	Hy-gain TH3MK3 antenna, 3 el. beam, 20, 15 & 10 m. 8.5dB gain, 1kW rating.	$195.00
Cat D-4301	Hy-gain 18AVT antenna, 24ft all band vertical (80 – 10) Robust construction.	$93.00
Cat D-4300	Hy-gain 14AVQ antenna, 40, 20, 15 & 10m. 19 ft vertical.	$78.00
Cat D-4705	RAK 5BQN antenna, dipole for 80, 40, 20, 15 & 10m. SWR 1.2:1, 2kW rating.	$47.50
Cat D-4704	RAK AL80/40DX antenna, loaded dipole for 80 & 40m, 52 ohms. Max legal power.	$69.00
Cat D-4150	Hustler 4BTV antenna, 40 – 10m vertical. Max SWR 1.6:1, 21.5 ft high.	$110.00
Cat D-4152	Hustler MO-1 mobile mast, suits all RM - - series resonators.	$28.50
Cat D-4154	Hustler MO-2 mobile mast, as above but bumper mounting.	$28.00
Cat D-4156	Hustler RM80 resonator for 80 metres, suits MO-1 or MO-2 (see above)	$29.50
Cat D-4158	Hustler RM40 resonator for 40m	$28.50
Cat D-4160	Hustler RM20 resonator for 20m	$24.50
Cat D-4162	Hustler RM15 resonator for 15m	$23.50
Cat D-4164	Hustler RM11 resonator for 11m	$19.00
Cat D-4166	Hustler RM10 resonator for 10m	$19.00
Cat D-4170	Hustler SSM2 antenna mount (mobile) inc. 180° adj. stainless steel ball.	$25.50
Cat D-4180	Hustler MM1 cowl mount, includes 180° ball and SO-239 skt. Accepts PL259 plug.	$10.50
Cat D-7010	Dummy load, 50 ohms, rated 100W cont. (int. would be far higher)	$23.75
Cat D-7080	Shinwa 1005 TVI filter, low pass 30MHz, 52 ohms, loss 0.7dB, max. attn. 50dB.	$23.75
Cat D-7190	MC-701 microphone compressor, 25dB max, fully variable, internal batteries.	$47.50
Cat D-5500	HC-500 antenna coupler. Tunes any antenna for 1:1 SWR, 3.5 – 30MHz. 52 ohms input.	$166.50
Cat D-7200	6KD6 transmitting valve	$8.55
Cat D-7201	6SJ6 transmitting valve	$8.25
Cat D-7202	6146 transmitting valve	$9.00
Cat D-7203	6LQ6 transmitting valve	$12.00

NOVICE EQUIPMENT

Cat D-1700	Midland 13-892 transceiver, SSB/AM, 11m, 23 channels. RF gain controls, etc.	$279.50
Cat D-1436	Midland 13-882C transceiver, AM, 11m, 23 channel , delta tune, ant. warning light.	$159.50
Cat D-1430	Midland 13-830 transceiver. 11m, AM for budget minded. 23 channels, 5W input.	$125.00
Cat D-4142	Mobile 1 Helical antenna. 11 metres, covered in durable plastic. B/Lee base.	$20.00
Cat K-3134	Novice Transvertor Kit. Build yourself. 27MHz to 3.5MHz novice channels. Max. output.	$99.50

VHF EQUIPMENT

Cat D-3100	Kenwood TS700A transceiver, 2m, SSB, FM, CW, & AM. AC/DC, 22 channels. Special:	$750.00
Cat D-3007	Multi 7 2m transceiver, 23 channel capacity (one channel fitted) FM.	$189.00
Cat D-3010	Multi 2000A transceiver, SSB/CW/FM, 2m. 144 – 148MHz in 10kHz steps. AC/DC.	$550.00
Cat D-3500	Europa B transvertor, 28-30MHz to 144-146 MHz. Capable of any mode trans. uses.	$239.00
Cat D-3502	Kenwood TV-502 transvertor, suits TS520 transceiver, ouput 144 – 146MHz.	$289.00
Cat D-3040	Icom IC202 transceiver, 2M, SSB & CW. Covers 144 – 145MHz, comp. portable.	$219.50
Cat D-4620	Green GA6020 antenna, 5/8 144MHz; 1/4 50MHz. S/steel whip, 1.3m long.	$22.50
Cat D-4200	Hustler G6 144A colinear base antenna, shunt fed, SWR 1.2:1. Stands 100mph wind.	$88.50
Cat D-4600	3Y2D antenna , 3 element beam for 144 MHz, gain of 5dB, knocks down for portable use.	$16.50
Cat D-4610	RAK 42S antenna, 1/4 wave 144MHz, s/steel whip, standard PL259 plug base.	$8.50
Cat D-4611	RAK 82S antenna, 5/8 wave 144MHz, s/steel, 1.25m whip, PL259 base.	$11.50
Cat D-4650	Antenna element bracket , takes 3/8in rod for making beam antennas. Insulated type.	$0.55
Cat D-2561	NAG50XL linear amplifier for 6m band, 10W driver for 100W out, inbuilt supply.	$379.00
Cat D-2560	NAG144XL linear amp for 2m band, same specs as above unit.	$379.00
Cat D-2807	Daiwa SR9 receiver, 2m, FM, 11 channel plus VFO 146 – 152MHz. 12V DC.	$118.00
Cat D-3806	Ham Prods ERB6 RF amplifier, 6m , 20–30dB gain for rec. 9 – 12V DC @ 15mA.	$25.90
Cat D-3802	Ham Prods ERB2 RF amplifier, 2m, same specs as above.	$25.90
Cat D-3832	Ham Prods. EXC2 converter, 2m, for 52-54 MHz, IF output on 28–30MHz.	$35.50
Cat D-3836	Ham Prods. EXC6 converter, 6m, for 144-146MHz, IF output 28–30MHz.	$35.50

SWL EQUIPMENT

Cat D-2850	Yaesu Musen FRG-7 receiver. 550kHz-30MHz, Wadley Loop. 240/12V, 0.25uV sensitivity.	$325.00
Cat D-2866	Kenwood QR-666 receiver. 170kHz-30MHz. All modes (FM optional), band spread, ANL.	$230.00
Cat D-2801	Drake SSR-1 receiver. 550kHz-30MHz, Wadley Loop. 5kHz dial accuracy, 3 way power.	$343.00
Cat D-4701	RAK listener 1 'V' antenna. 3 – 30MHz, with trap. Comp. assembled. Ideal for DX work.	$22.50
Cat D-4703	RAK Listener 3. Long wire dipole, supplied with balun & all accessories, 3 – 30MHz. Ultimate!	$51.00

ACCESSORIES

Cat D-7104	Hi-mound morse key. Double ball pivot rollers and adj spring. Contacts for break-in keying.	$23.75
Cat Q-1340	Osker Bloc SWR200 SWR & power meter. 3–30MHz, Pwr 0–2kW; SWR 1:1 – infinity.	$67.50
Cat Q-1360	FS5 SWR/power meter. 3 – 30MHz, dual imp. Pwr 0–100W; SWR 1:1 – 1:3.	$34.50
Cat D-5310	RAK BL50A balun, 52 ohms unbal/52 ohms bal. T shape, use as centre support for dipoles.	$20.75
Cat D-4508	TOO7 Antenna quick release (mobile) Take the antenna off to avoid vandalism & damage.	$7.90
Cat D-2875	SS727 Slow Scan TV. Receives both SSTV & ordinary TV. 240V AC operated.	$598.00
Cat D-5204	Apollo 3 position co-axial switch. Low insert. loss, standard PL259 connectors.	$22.50

DICK SMITH ELECTRONICS GROUP

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Dick Smith Dealer Prices may be slightly higher in some cases to cover freight charges.

RADIO TELETYPE

Jostein Gjerde, LA7MC

PART ONE

INTRODUCTION TO RTTY

We present the first of eight excellent articles on the subject of RTTY covering theory and practice. These articles were first published in consecutive issues of "Amateur Radio" the official publication of the Norwegian Radio Relay League. The first article was published in the NRRL AR number 5, 1972. These articles were translated by VK3ZPA's XYL. Her efforts are gratefully acknowledged.

THE TELEPRINTER

The Teleprinter is like an electric typewriter in appearance. It is mostly used in the Telex and similar services. The machines are connected in a current loop and communicate by means of a serial digital code. Generation and reception of letters and symbols depends on the way the loop current is broken. If only two machines are in circuit they are connected in series with a voltage source and a current limiting resistor. As the machines are series connected via two wires, the operating current flows through a loop, hence the term "current loop".

There are two types of information, current (mark) and no current (space). Each letter or symbol is composed of 5 pieces of information which are either marks or spaces and each combination represents a particular letter or symbol. Besides these 5 combinations, a complete symbol also contains a start pulse and a stop pulse.

When a signal is sent from the transmitter, the 7 different pulses are sent in order. The start pulse begins a decoding of the 7 pulses at the receiver end, and thus decoding must naturally be done at the same speed as the transmitter generates the pulses, if the combination shall be correctly read. It is therefore very important that teleprinters connected to the same network, work at the same speed.

The speed used by amateurs is normally described as 45 baud. The description "baud" means current pulses or "bits" of code per second. Fig 1 shows how a teleprinter signal works when this system is used. As you can see, the start pulse and the 5 identification pulses are each 22 millisecond duration. When you wish to find the speed given in baud, take the reciprocal of the shortest pulse in the signal 1/0.022 = 45.45 baud.

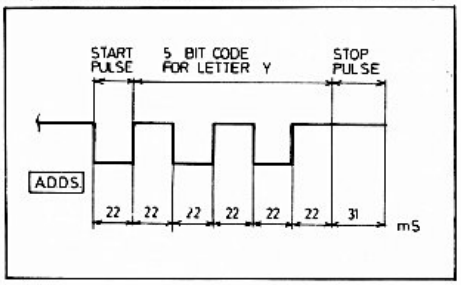


FIG. 1 EXAMPLE OF TELEPRINTER CODE

Fig 2 shows a comparison of the different Teletype systems existing and some of these you can also hear as teletype signals on the short wave bands.

BAUD	WORD MIN	PULSE LENGTH	STOP PULSE	DESCRIPTION
45.5	65	22mS	22mS	WESTERN UNION STANDARD
"	62.5	"	28mS	
"	61.3	"	31mS	AMERICAN AMATEUR STANDARD
"	57.2	"	43mS	U.S. GOVERNMENT STANDARD
50	66.6	20mS	30mS	INTERNATION. STANDARD
"	62.5	"	40mS	
56.9	75	18mS	25mS	
74.2	100	13.5mS	19mS	

FIG. 2

TRANSMISSION OF TELEPRINTER SIGNALS BY RADIO (RTTY)

In transmission of teleprinter signals by radio, frequency-shift-modulation or F1 is used. We make the transmission frequency jump to and fro to correspond with 'Mark' and 'Space'. The size of this frequency jump is what is called the shift. The shift most often used previously was 850 Hz, but in recent times there has been increasing use of a small shift i.e. 170 Hz. This has many advantages e.g. one uses a smaller portion of your allotted frequency band and somebody receiving can use a small bandwidth on the receiver and thereby get a better signal/noise ratio.

Where commercial stations are concerned, there are many different shifts (including 850 Hz) but the one most commercially used is 425 Hz.

When you wish to key the transmission frequency it can be done in two different ways:—

1. You can act upon the oscillator in the transmitter with the teletype signal such that the transmitted signal jumps in time with 'Mark' and 'Space'. This is called high frequency shift keying (HFSK). Vari-cap diodes are a popular means of achieving HFSK.

2. If you have a single-sideband-transmitter modulated with a single 2125 Hz tone, this will result in the transmitter giving out a single high frequency wave which lies, for example, 2125 Hz below the suppressed carrier wave if you use the lower sideband, or 2125 Hz above the suppressed carrier wave if you use the upper sideband. If you now vary the modulation tone frequency, this will make it appear that the transmitted "carrier wave" changes its frequency. This is called audio frequency shift keying or AFSK.

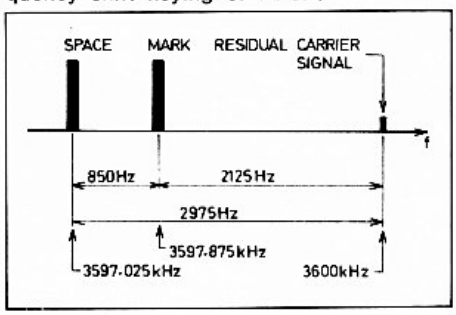


FIG. 3 MODULATION FREQUENCIES

Fig 3 shows how the 'Mark' and 'Space' would be if you modulated with tones of 2125 Hz and 2975 Hz on a carrier wave (suppressed) of 3.6 MHz, using the lower sideband. We see that the 'Mark' signal lies at a higher frequency than the 'Space' signal.

It is recommended that you use the two tones given in the example. There are, however, difficulties with such high modulation frequencies with most single-sideband transmitters.

The usual SSB filters will not let through a tone of 2975 Hz during transmission, and if you have a similar filter on the receiver (such as you have in a transceiver) you will not receive the tone.

You can then procure an extra carrier crystal which lies about 1 kHz higher and the problem is solved both for transmission and receiving. (This new crystal is naturally unsuitable for telephony).

Another solution, which is much used, is to use lower modulation and receiving tones, e.g. 1050 and 1900 Hz, but the solution is not recommended by experts and you will, in any case, get into difficulties if you later want to change over to use one or other ready-built converters e.g. ST-6.

(to be continued) ■

WILLY WILLY'S WONDER
AN ANTENNA COUPLING UNIT FOR THE EXPERIMENTER

M. N. O'Burtill VK3WW
3 Maxwell St., Lalor, Vic. 3075

This is a project without complications that is useful in any shack, easy and cheap to build, and above all completely lacking in the frustrations of modern electronics caused by our fetish for 3, 8, 14 etc. legged fuses!

Use as much heat as you like — weld it if you want, any damage to a component can be seen a yard away (without glasses).

This is an Aerial Coupling Unit (ACU) that has been in use in my shack for many years. The details have been given to quite a few other amateurs and all have met with success.

The circuit is simple (Fig. 1). I have deliberately not marked values on the circuit because they are quite flexible.

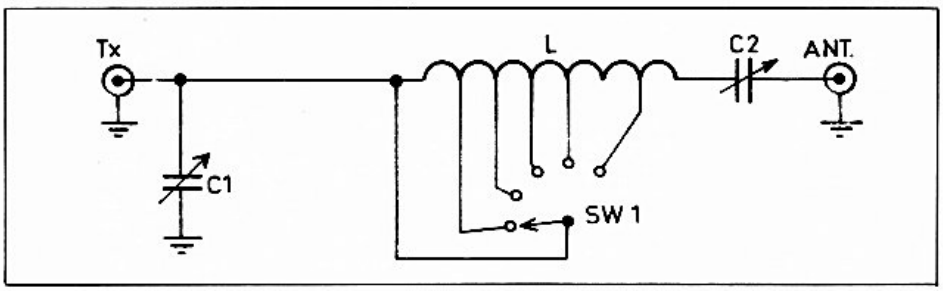


FIG. 1

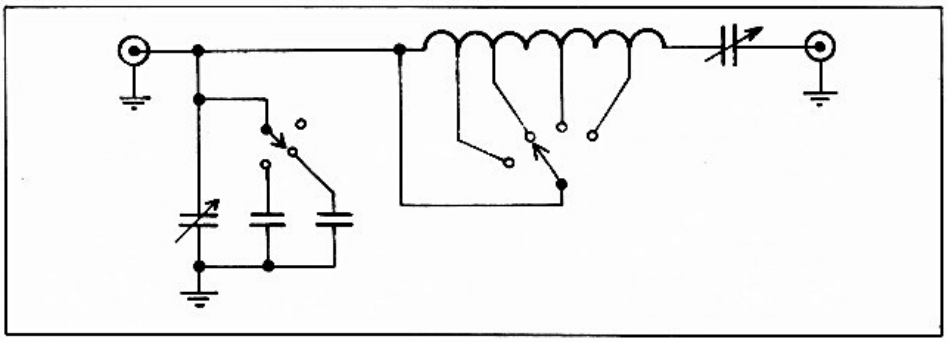


FIG. 2

When I first built this unit I used components from my old AM rig, so C_1 was the plate tuning capacitor, L was a Geloso pi coupler coil complete with switch and C_2 was a broadcast 3 gang capacitor.

At this stage let me say that application of this unit can become complicated, so first decide just what you want to do with it. For a home station you may want to match 3 or 4 different antennas on all HF bands and achieve an SWR of 1:1 or thereabouts. For mobile or portable use, a one band one antenna set up may be all you need.

COMPONENTS

The components can be varied quite a lot.

C_1 is usually 150-200 pF full mesh and in some cases fixed C is switched in parallel to give the desired result. (Fig 2).

Coil L can be a duplicate of the Geloso coil: others have used variations such as

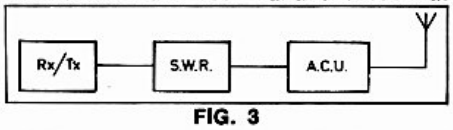


FIG. 3

2" diam. 4" long, 3" diam. 5" long and so on.

C_2 in my ACU is a 3 gang BC with gangs in parallel. A single gang, for most applications, would have been sufficient.

L and C_2 are in series with your antenna line, so varying one will cause a variation in setting of the other. Switch S_1 should be a ceramic switch with a progressively shorting contact. These are pretty hard to get these days so an ordinary 5 or 6 position Oak switch will do the job and with full power input should last two or three years. When it goes you will hear and smell it quickly!

OPERATION

Let's now look at Fig 3 and start to use this ACU to our benefit.

First put C1 in full mesh and L on Tap 1. Tune in a signal on the band and then sweep C2 through its range and look for an increase in signal strength. If there is no improvement switch to the next L tap and sweep C2 from full to minimum mesh once again. Repeat this until you have reasonable signal received.

Now tune up your transmitter into a dummy load of the same impedance as you hope your antenna will show. For this operation take the ACU out of circuit (Fig 4). Naturally if the dummy load is any good the SWR will be 1:1. Connect your antenna in place of the dummy load and note the SWR without touching the transmitter.

Now back to the set up in Fig 3. Check the SWR with the ACU set up for receive, then transmit and tune C2 for a dip in reflected power. This dip should be quite sharp. Tune C1 to improve this dip in reflected power. The SWR should be very close to that obtained with your dummy load. Remember on HF you can accept up to 2:1 without damage to your final tubes or serious loss of power, unless using one of the solid state untuned final circuits with infinite SWR protection. Then you will do no damage but will lose a lot of power.

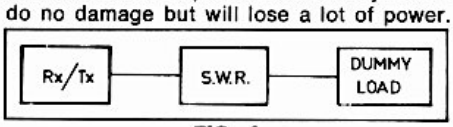


FIG. 4

If no sharp dip can be obtained with C2 try another coil tap. If no combination of C2, L, and C1 will give you the above results, your antenna is just not capable of resonating within the band or your ACU components are way, way off. This last would surprise me as I have seen such a variety of coils and capacitors used successfully.

CONSTRUCTION HINTS

Building the unit is easy. Use solid wire 20 gauge or heavier. Don't forget C2 is in

series so will need good insulation from surrounding metal work and particularly good insulation for the tuning knob. An insulated coupling to the shaft is the best for the latter.

VARIATIONS

Now a few ideas for the adventurous. Adding parallel C to C1 has already been mentioned; the number and complexity of the switching is up to you.

How many taps on L? If you can get a suitable switch a dozen or more taps can be used; you could even use two switches and treat L as two coils in series. A roller inductance is a good idea if you have one available.

Changes in C2 are a little harder due to insulation problems but fixed C high voltage types can be used in some cases with suitable switches (Fig 5).

MOBILE

For mobile/portable work let's try for a coupler that will change bands by using only one switch with no capacitor tuning at all. The trick here is to use small spaced trimmers combined with high voltage fixed capacitors. I have not yet tried this but feel the best method would be to improvise an ACU using the coil you intend to use in the finished unit and calibrated variables for C1 and C2.

Suppose we are using a helical on 80m. Tune up and note settings of C1 and C2 and the tap on L. Now replace C1 and C2 with trimmers and fixed C such that the trimmers give the same capacity as the original settings when set at half mesh. (In some cases you won't need any fixed capacitors.) Retune and you should be able to obtain the same results as before, but now the size of the unit is determined mainly by the coil. A word of warning — you can experience "flash over" in C1 or C2 if using full power and close spaced plates on the trimmers. Lower powered rigs such as the FT75B should work with small trimmers.

For C1 and C2 in the test rig any reasonable variable capacitors will do. Try a 200 pF in C1 and a two gang BC type for C2. Calibrating them is time-consuming using a GDO but quite accurate enough. If you have access to good measuring equipment I suggest you fit the two gang capacitor with a dial and calibrate it accurately. Such a capacitor is a very handy thing to have in the shack if you are inclined to experiment. Fig 6 shows the circuit. The only complication is the switching. The benefit is a one switch band change and your ACU is set for the band in use.

HOME STATION

Further additions may be made to home station units by using co-axial switches. Suppose you have a G5RV for all bands, a dipole on 40m and a tri-band beam for 20, 15 and 10m.

You want to use the coupler with the G5RV and the beam but not with the dipole. The use of two co-ax switches gives you a quick method of selecting the correct combination. Naturally this facility puts cost into the system as co-ax switches are not cheap.

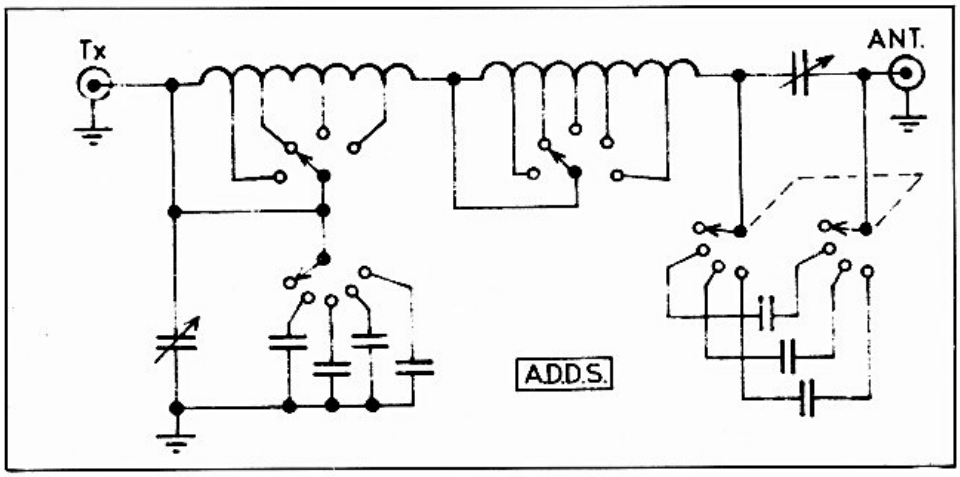


FIG. 5

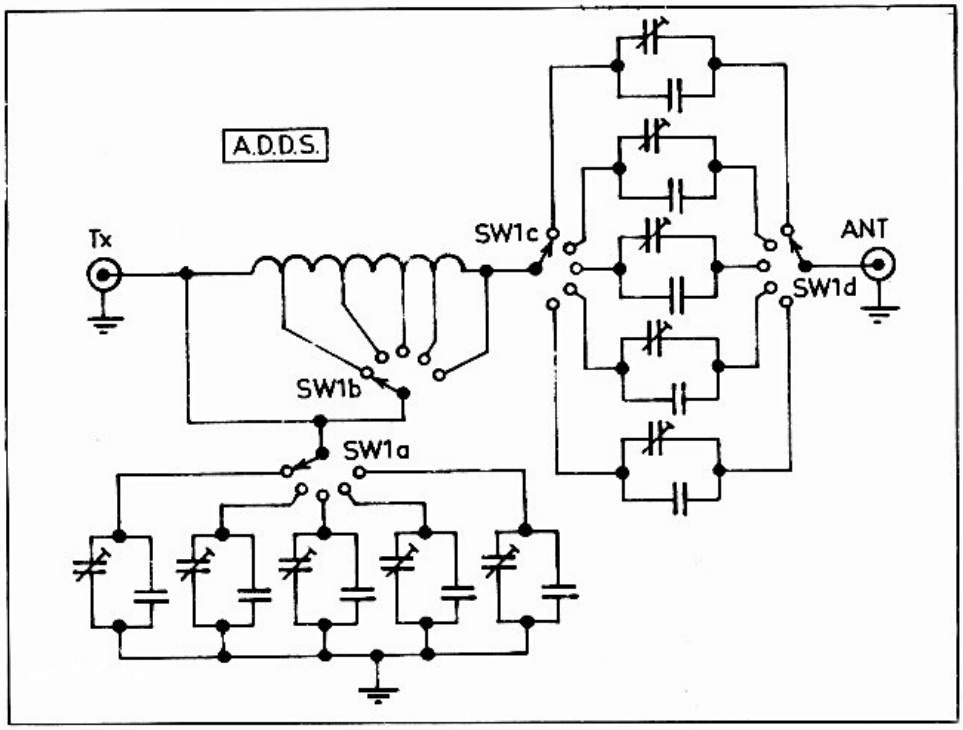


FIG. 6

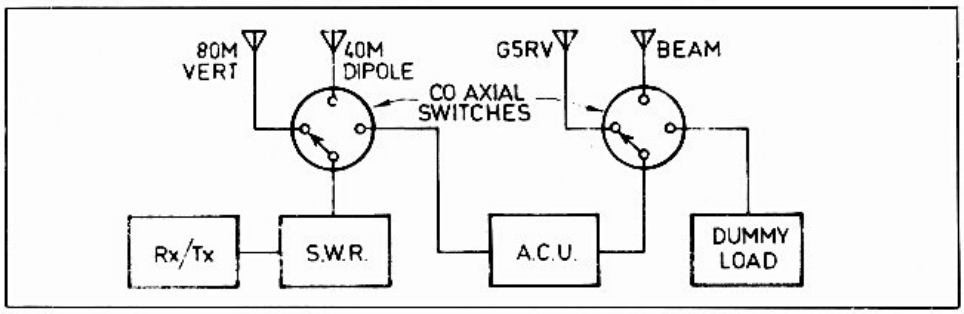


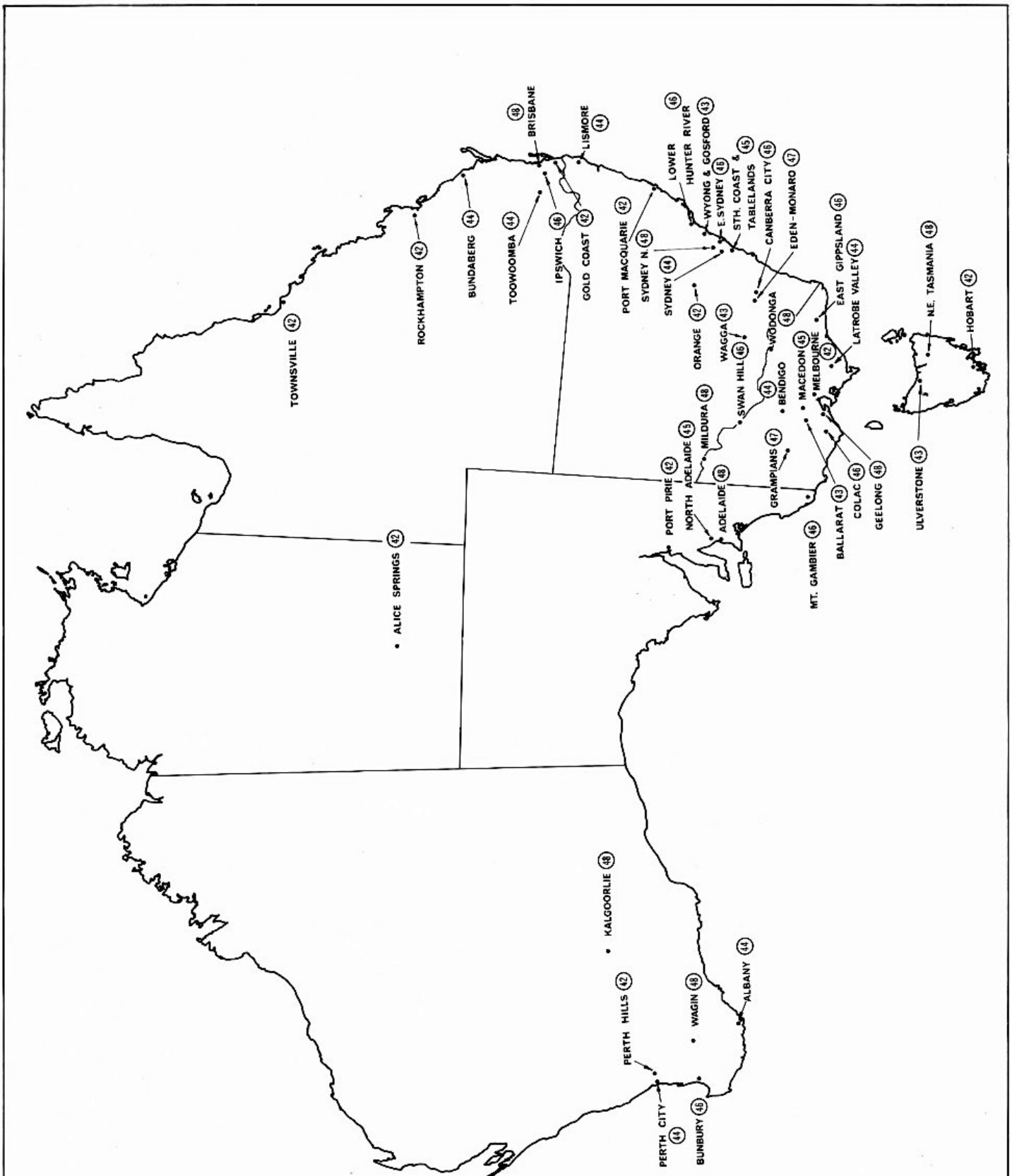
FIG. 7

Fig 7 shows a home station coupler which is very versatile and not too complicated to build or use. On air tests with this ACU have proved conclusively that its use can give a few extra watts to your antenna and thus a few more microvolts at the receiving end where it is needed.

Should any reader wish to discuss any particular details I will be happy to arrange a sked one evening.

A final warning — this ACU will not perform miracles. Your antenna must be capable of resonating in the required band. The ACU puts the final polish on it. ■

2m REPEATER LOCATIONS & CHANNEL NUMBERS



Area	Call Sign	Ch.	Time Out (Min)	Ident Mode	Power Watts	Mobile Range (km)	Height ASL (m)	Site	Sponsor	Status
AUST. CAPITAL TERRITORY										
Canberra City	VK1RAC	46	4	MCW	10	100	887	Mt. Majura	ACT WIA	Operational
Eden-Monaro	VK1RGI	47	4	MCW	40	325	914	Mt. Ginini	ACT WIA	Operational
NEW SOUTH WALES										
Pt. Macquarie		42	3	MCW	20	65		Transit Hill	Oxley Reg. RC	Operational
Western Plains	VK2RAO	42	3	MCW	50	160	1400	Mt. Canobolos	Orange District RC	Operational
Wagga	VK2RWG	43	4.5	MCW	10	85	550	Mt. Flackney	Wagga District RC	Operational
Wyong and Gosford	VK2RAG	43	3	MCW	30	60	170	Karriong	Cent. Coast ARC	Operational
Lismore	VK2RIC	44	4	MCW		80		Parrots Nest	Summerland RC	Planning
Sydney S. Suburbs	VK2RLE	44	4	MCW	30	80	150	Engadine	St. George ARC	Operational
S. Coast and T/lands	VK2RAW	45	4	MCW	70	120	760	Mt. Murray	Illawarra ARS	Operational
Lower Hunter River	VK2RAN	46	4	MCW	30	140	402	Gt. Sugarloaf	Hunter Br. WIA	Operational
Sydney Eastern Suburbs	VK2RBV	46	4.5	MCW	30	100	100	Waverly	Waverly ARC	Operational
Sydney Northern Suburbs	VK2RAS	48	3	MCW	40	80	228	Dural	NSW WIA	Operational
VICTORIA										
Melbourne	VK3RML	42	2.5	MCW	50	130	600	Mt. Dandenong	Vic. WIA	Operational
Ballarat	VK3RBA	43	3	MCW	15	20	70	Mt. Bunningyong	Vic. WIA	Operational
Bendigo	VK3RAM	44	2.5	FSK	40	100	740	Mt. Alexander	Midlands Zone WIA	Operational
Latrobe Valley	VK3RLV	44	2.5	MCW	40	120	730	Mt. Tassie	E. Zone WIA	Operational
Mt. Macedon	VK3RMM	45	2.5	MCW	25			Mt. Macedon	Vic. WIA	Testing
Swan Hill	VK3RSH	46	2.5	MCW	40	50	63	Swan Hill	Swan Hill ARC	Operational
East Gippsland	VK3REG	46	4.5	MCW	25	100	900	Mt. Sugarloaf	E. Zone WIA	Operational
Colac	VK3RSW	46	3	MCW	25			Otway Ranges	Vic. WIA	Planning
Grampians	VK3RWZ	47	2.5	MCW	25	130	1170	Mt. William	W. Zone WIA	Operational
Mildura	VK3RMA	48	4	MCW	100	55	51	Mildura Airport	N.W. Zone WIA	Operational
Geelong	VK3RGL	48	3	MCW	25	120	340	Mt. Anakie	Vic. WIA	Operational
Wodonga	VK3RNE	48	3	MCW	25			Mt. Big Ben	N.E. Zone WIA	Operational
QUEENSLAND										
Gold Coast	VK4RGC	42	4.5	MCW	50	60	500	Mt. Tamborine	Gold Coast RC	Operational
Townsville	VK4RAT	42	4.5	MCW	10	75	740	Mt. Stuart	Townsville ARC	Operational
Rockhampton	VK4RAR	42		MCW	20	80		Mt. Archer	Central WIA	Operational
Toowoomba	VK4RDD	44	4.5	MCW	10	80	636	S.E. Toowoomba	Darling Downs RC	Operational
Bundaberg	VK4RGU	44		MCW	20			Mt. Goomamemah	Bundaberg RC	Planning
Ipswich	VK4RAI	46	4.5	MCW	20	60	400	Denmark Hill	Ipswich ARC	Operatlonal
Brisbane	VK4RBN	48	5	MCW	50	80	632	Mt. Glorious	Brisbane WIA	Operational
SOUTH AUSTRALIA										
Port Pirie	VK5RMN	42	5	MCW	10		730	The Bluff	S. Australia WIA	Operational
North Adelaide	VK5RHO	45	2.5	MCW	25	80		Houghton	S. Australia WIA	Operational
Mt. Gambier	VK5RMG	46	5	MCW	25	80	100	SES-8 Studios	S. Eastern RC	Operational
Adelaide	VK5RAD	48	9	MCW	15	80	610	Croffters	S. Australia WIA	Operational
WESTERN AUSTRALIA										
Perth (Hills)	VK6RAP	42	5	FSK	25	160	360	Roleystone	W. Australia WIA	Operational
Perth (City)	VK6RAH	44	5		25	60	90	Wireless Hill	Perth Rep. Group	
Albany	VK6RAA	44	5	MCW	40	100	430	Mt. Barker	South. Electrical Gp.	Operational
Bunbury	VK6RBY	46						Mt. William	W.A. Rep. Group	Planning
Wagin	VK6RAW	48	5	MCW	12	70	395	Mt. Latham	W. Australia WIA	Operational
Kalgoorlie		48								Operational
TASMANIA										
Hobart	VK7RHT	42		MCW	70			ABT2 Tower	S. Branch WIA	Operational
Ulverstone	VK7RNW	43	4.5	MCW	30	60	70	Mt. Leona	N.W. Branch WIA	Operational
North-East Tasmania	VK7RAA	48	5	MCW	60	190	1400	Mt. Barrow	N. Branch WIA	Operational
NORTHERN TERRITORY										
Alice Springs		42								Operational

REPEATER CHANNEL NUMBERS AND FREQUENCIES

Repeater Ch. No.	INPUT		OUTPUT		Repeater Ch. No.	INPUT		OUTPUT	
	Ch. No.	Freq. MHz	Ch. No.	Freq. MHz		Ch. No.	Freq. MHz	Ch. No.	Freq. MHz
41	41	146.05	53	146.65	45	45	146.25	57	146.85
42	42	146.10	54	146.70	46	46	146.30	58	146.90
43	43	146.15	55	146.75	47	47	146.35	59	146.95
44	44	146.20	56	146.80	48	48	146.40	60	147.0

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

Dec.	11/	
Jan.	16	ROSS HULL VHF MEMORIAL CONTEST.
	8/9	YU 80 Metre Contest.
	15/16	"Hunting Lions" Party.
	15/16	DL QRP CW Contest.
	28/30	CQ WW DX 160 Contest.
	29/30	French CW Contest.
	29/30	Classic Radio Exchange.
	29/31	VHF Mid-Summer Field Day Contest.
Feb.	5/6	ARRL DX Phone Contest.
	12/13	JOHN MOYLE MEMORIAL NATIONAL FIELD DAY.
	19/20	ARRL DX CW Contest.
	19/20	YL - OM Phone Contest.
	26/27	French Phone Contest
Mar.	5/6	ARRL DX Phone Contest.
	5/6	YL - OM CW Contest.
	19/20	ARRL DX CW Contest.
	26/27	CQ WW WPX SSB Contest.

YU 80 METRE CONTEST

GMT Jan. 8 to 2100 GMT Jan. 9.

Exchange RST and QSO number. Score 1 point for contacts between stations in same country, 2 points with other countries on same continent, countries on other continents 5 points. YU stations count for 10 points. Multiplier is one for each DXCC country and each YU prefix worked. Certificates to top scorers in each country with 2nd and 3rd place awards where justified. All VK call areas considered separately for awards. There are also trophies for continental leaders. Logs to reach YU DX Club of SRJ, P.O. Box 48, 11001, Belgrade, Yugoslavia, by March 1st, 1977.

"HUNTING LIONS" QSO PARTY

1200GMT Jan. 15 to 1200 GMT Jan. 16, 1977.

This activity is sponsored by Lions International, and co-ordinated by the Lions Club of Rio de Janeiro, Brazil. This activity is between Lions and non-Lions. Exchange Name, QTH, QSO No. and the time. Lions will add their Club name. Score 1 point per contact, 2 points if it is with another country. VK's can claim 2 bonus points for working the Arpoador or Marumbi Clubs of Brazil. Frequencies used are the top 25 kHz of 40, 20, 15 and 10 metre phone and CW bands. There are awards for both Phone and CW. Send logs within 30 days to: Lions Club of Rio de Janeiro (Arpoador), Rua Souza Lima n. 310 — Apartmento 802, Rio de Janeiro — 20.000 ZC 37, Brazil.

CW WW DX 160 CONTEST

GMT Jan. 28 to 1600 GMT Jan. 30.

Rules are the same as previous years. This is a CW only contest. Send RST and serial number. Claim 2 points per QSO within same country, 5 points with other countries. W/VE/VO count 10 points. Multipliers are 1 for each US state, VE province and DX country worked. Final score is total QSO points times the sum of the multiplier. Send logs to CQ 160 Contest, 14 Vanderventer Ave., Port Washington, L.I., N.Y. 11050, by Feb. 28, 1977.

FRENCH DX CONTEST

CW 0000 GMT Jan. 29 to 2400 GMT Jan. 30, 1977. Phone 0000 GMT Feb. 26 to 2400 GMT Feb. 27, 1977.

Contest exchange includes continental France, DUF countries and the following prefixes: ON, HB, LX, VE2, OD, HH, 3B, 9U, 9Q, 9X, French stations will give RS(T) and 2 figures identifying their department. Others give RS(T) and QSO number. HB and ON may give 2 letter abbreviation for Canton or Province. Each QSO 3 points. Contacts with F6REF and F8REF are worth 10 points. Multiplier is one point for each French Department (95), Swiss Canton (22), Belgium Province (10), and each DUF country. Plus LX, VE2, OD, HA, 3B, 9U/Q/K. Final scores is total QSO points times sum of multiplier from all bands. Logs to REF Traffic Manager, Lucien Aubry, F8TM, due Marceau 53 — 91120 Palaiseau, France.

VHF MID-SUMMER FIELD DAY

1200 ESST 29th Jan. to 1400 ESST 31st Jan., 1977.

This field day is conducted by the VHF and TV group of NSW, over the Australia Day long weekend. All bands above 52 MHz may be used. Each station may be worked once per band per clock hour. The minimum contact distance is 1 kilometre. Crossband, HF and repeater may be used to set up contacts, but not for scoring. Oscar 6 and 7 are not classified as repeaters for this contest. There are 3 sections — Field stations, Mobile stations, and Home stations. The best consecutive 6 clock hours and the best overall score in each of the above sections.

Entries must give the call sign and **TOTAL** points claimed for each station worked; there is no need to submit complete log extracts. Include a cover sheet and a signed declaration. Entries go to the VHF and TV group, 14 Atchison Street, Crows Nest, NSW 2065, before March 14th, 1977.

SCORING TABLE

km	6M Net	Tune	2M Net	Tune	70 cm	ATV	50 cm up
1-50	2	3	1	3	4	20	10
51-100	4	6	2	6	10	50	50
101-150	10	15	5	15	30	150	100
151-300	20	30	10	30	50	250	200
301-500	50	75	15	45	100	500	500
501-800	40	60	25	75	200	1000	600
801-1200	30	45	35	105	400	2000	700
1201-2000	20	30	75	225	500	2500	800
2001 up	50	75	125	375	600	3000	1000

Oscar 2-10 translator 20 VK/ZL, 50 other countries.
7-2 translator 50 VK/ZL, 100 other countries.
ATV serial numbers must be exchanged on vision and sound. ■

MAGAZINE INDEX

Syd Clark, VK3ASC

BREAK-IN September
The Browning-Drake Receiver; Profile of a Radio Pioneer; Ralph Slade; Vari-Cap VFO.

CQ MAGAZINE June
A Canoe, A PM2B, es QNI QTC QRPp 9/0; Review: Heathkit HW-2021; 1975 WW CQ DX-Contest, Phone Results; Making IC Projects Work; Antennas.

HAM RADIO August
High Frequency Receiver Design; Multiband HF Converter; Microwave Amplifier Design; Two Channel VHF FM Receiver; Four Band VHF Converter; Up-dating Tube Type FM Receivers.

October
High Performance VHF FM Transmitter; RTTY Demodulator; Application and use of the Hand Held Calculator; Syllabic VOX System for Drake Equipment; Derivation of Electrical Units; IF and Detector Module; Digital Television Scan Converters; Coaxial Dipole Antennas; Facts and Fallacies; Differential Keying Circuit; TTL IC Tester; VHF Bandpass Filter; Microprocessors.

QST July
A Few Publick-Spitited Hammes; His Eminence — The Receiver; Understanding Modern Oscilloscopes; The Herring-Aid Five; The Maunder Minimum; A Wide Range Crystal-Controlled Frequency Standard; Enhance the Performance of Your Accu-Memory; RFI Packet Up-date.

September
Meet the Microprocessor; The Mini-Miser's Dream Receiver; VHF FM Receiver Trouble-shooting; The Tower Shield; Hot and Cold Resistors as UHF Noise Sources; RFI Grows Up; Oscars Help Dedicate New Air and Space Museum; California to Hawaii on 2 Metres; A Fist from the Sky; Morse Decoded; Radio Scouting at NORDJAMB-75.

RADIO COMMUNICATION September
Practical Polyphase: A Fourth Generation CW Keyer Using CMOS IC's; The IP Quad; Tunable Gunn Oscillators.

RADIO ZS May to September
Direction Finding; Some Ideas on Filters; Convert Your AM Rig to DSB; Looking at the LM 373.
TV Masthead Amplifiers and Their Problems to the Amateur; Hamming it Up on the Rio Yacht Race; An Active CW Filter; Build a Two Metre Transverter.
Historic IARU Region 1 Conference-Gaberone; A Quick and Simple 160 Metre Transverter.
How to Build a Digital Read-Out for Your Argonaut; A Stable VFO.
A Medium Power Two-Metre Linear Amplifier.

SHORT WAVE MAGAZINE August
QRO Linear for Multi-Band Working; Clipper for the Liner-2; Two-Metre Transistor Converter; Sideband/CW Adapter for BC Receivers; CC BFO for SSB. ■

20 YEARS AGO

Ron Fisher, VK3OM

JANUARY, 1957

To mark the 1956 Olympic games held in Melbourne, VK3WI co-operated with VK7WI in receiving a message of greetings from the Greek Radio Amateurs. The message was transmitted from Mount Olympus in Greece to VK7WI operating portable from Mount Olympus in Tasmania, and was later passed on to VK3WI and then handed to the Chief Executive Officer, Olympic Games Committee in Melbourne.

Transistors were mysterious objects to most of us in 1956 (they still are to many old-timers), but Hans Albrecht VK3AHH threw some light on the subject of audio amplifier design in the January, 1957, issue of AR.

Diagnosis of TVI, a reprint from the RSGB Bulletin, was one of those articles that did not actually tell you how to cure your TVI but rather how to diagnose the cause. Frank Fowler VK2APF described his "Simple Mobile Whip for 40-80 metres". Basically a centre loaded whip with a slider on the coil to change bands, Frank claimed to have worked ZL's on both bands with 4 to 8 watts input.

Improving receiver sensitivity was always an interesting pastime. When new tubes became available, they were always tried to see if they outperformed the old. D. G. Hawthorne VK3ZCD described the improvement he got by substituting a 6BY7 for a 6AG5 in his CR 100 receiver.

A popular AR column twenty years ago was the SWL section. In those days it was compiled by Ian Hunt L3007, now better known as VK5QX. Many of the "junior" members mentioned from time to time are now well known amateurs.

Included in the VHF notes was a description of a television set built by Keith VK3HK. Just to stir your memory, here is a description of the set-up. A Loran CRO with a 5CP1 was the basis with the turret and IF strip from a Rebecca R1045 radar transceiver. The sync separator used a VR65a as did the frame oscillator. It was often amazing the picture quality that could be obtained from such a set-up. ■

AROUND THE TRADE

DAICOM HAS MOVED

Well known ACT amateur, Andrew Davis VK1DA, the Managing Director of DAICOM, has expanded his interests and has taken over the local business of Custom Scientific.

The new location is now at 29 Colbee Court, Phillip, ACT. Phone (062) 82 3581.

Daicom caters for all amateur requirements, and specialises in the sale of components, etc., for the professional market, and the servicing of equipment. ■

VHF-UHF
AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston, 5233

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Devonport	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
HL	HL9WI, South Korea*	50.110
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHP, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

SIX METRES

Naturally at this time of the year we all talk about six metres. And there is certainly plenty to talk about. The longer type of openings appear to have come a little later this year, and may well mean a later finish, and hopefully some excellent openings . . . a la 1963, etc. . . . during the period between Christmas and New Year, a period which has been somewhat shy of really good openings for several years.

All VK call areas except VK0 and VK9 have been available consistently since the middle of November, with mostly extremely strong signals. ZL stations have been readily available as well, with ZL1, ZL2, ZL3 and ZL4 being worked here. One pleasing contact was with Paul ZL1QI running 6 watts with signals peaking to S6.

Of particular interest to many six metre operators has been Ken YJ8KM in Vila, New Hebrides. First news of this station came from VK4ZSH who worked him on 1/11/76 with signals S9 + 40, and opened a new chapter being the first VK to YJ8 contact. Ken uses an FT101E to an FTV650 transverter and a 5 element beam at 40 feet. He has been beaming to VK every day between 0030 and 0230Z on 52.050, and reports having observed signals from TV stations on Channels 0, 1, 2, and 3 in Brisbane, Melbourne and Adelaide.

Stephen VK4ZSH goes on further to report that Ken YJ8KM will shortly be using a pair of 11 element yagis on 2 metres FM with 130 watts looking for repeater and Channel 50 contacts.

Further interesting news from VK4ZSH advises of the JA opening to Brisbane on 24/10 (reported last month's AR) and also the reception of unusual garbled signals on 144.100 while VK4ZBV reported hearing a JH signal just above 144.100. VK4ZCL and VK4ZKL both reported hearing French language telephone conversations on 144.360 on several occasions during October (possibly New Caledonia?). As a result of this, six metres is booming in Brisbane, with unheard of calls for years coming on the band.

It is noted also that 2 metres SSB is very active in Brisbane area with some 60 stations now on, with 1 to 2 newcomers each week. Dozens of 4CX250B linears for both 6 and 2 metres are under construction, and it is anticipated Brisbane will soon have more high power 2 metre SSB stations per head than most other places in Australia . . . Well that's really good news and it is to be hoped good use will be made of them. Thanks for the letter, Stephen, and look forward to hearing from you again.

AROUND THE BANDS

A new 2 metre SSB station near Nhill is Alan VK3ZFJ, and he has been worked in VK5 by the usual few stations keeping a watch on 2 metres. John VK5ZJP at Rose Park, a suburb of Adelaide, has worked Alan quite successfully, and one would hope a few more of the local 2 metre gang will become more active. There must be dozens of stations in Adelaide with 144 MHz SSB capability, most additions needed to the many small 3 watt rigs would be a solid state or similar 30 to 50 watt linear and a good horizontal antenna, e.g. 10 el. yagi, and you would be in business. It seems a pity more use is not made of 144 MHz SSB in VK5. We seem now to be the least active State, with a very mistaken impression VK3 cannot be worked from Adelaide. Heavens above, if I can work interstate 2 metre DX from my relatively poor location, surrounded by hills, then there are very many lost opportunities by Adelaide operators.

Ron VK3AKC complains of lack of contacts with VK5 so here are a few details of his schedules. Ron operates CW on 144.003 at 0900Z daily, and about the same period or soon after calls and listens in the Adelaide direction on 144.070. Ron has a good location at Geelong, with suitable antenna and power capability. He suggests also that those operators in Adelaide and elsewhere who operate on 144.100 MHz, the 2 metre calling frequency, with a view to making DX contacts, should allow a three second break between overs, as Ron is consistently hearing VK5 stations from Adelaide but cannot break in because each over is commenced too quickly and with weak signals he cannot be heard. So bear this in mind.

David VK5KK, who keeps an ear on VHF, was rewarded on 15/11 by working YJ8KM in the New Hebrides. Together with father, Keith VK5SV, this team is very active in keeping VHF alive in this State. I form another side to the triangle, and the few interested operators in Adelaide complete the circuit.

Reg VK1MP advises there are now 16 stations in VK1 with 2 metres SSB, and four on 432 MHz, so here is another area with suitable possibilities for VK3 and VK5 . . . Tony VK6BV in Kalgoorlie received a Father's Day gift of an IC22 so is now looking towards building a linear with two 4CX250B's to give him an opportunity of working distant 2 metre SSB stations.

Mike P29MJ is now VK7MC, having forsaken the jungle and heat of the tropics for the jungle and cold of Tasmania, and has a very strong 6 metre SSB signal into VK5 at the moment. Joe VK7JG, ex VK7ZGJ, reports ZL3QK was very strong on 6 metres for more than three hours on 21/11, and on this day he also worked YJ8KM, plus VK8ZCU and VK8ZTW for good measure. While still in Tasmania mention should be made that the 432.475 MHz beacon down there runs 15 watts to a tripler and is beamed through Launceston to Mt. Gambier, and believe it or not, that path is not too far off Adelaide, or me for that matter!

Some people move down from the tropics, others go up there. Mark VK5ZZZ and Barry VK5WB (Woolly Bear) are both going to Cairns and by all accounts will be doing what they can to direct signals back this way on both 6 and 2 metres SSB plus working through Oscar. These two, together with the already increased activity in the north of Queensland, could help to interest others up there.

John VK2BHO reports a strong lightning bolt got into the south coast repeater recently and did considerable damage, but the repeater should be back on the air now. Personally I never trust lightning, so when any storms are imminent I disconnect all antennae from my various pieces of equipment. Living in the hills we are subjected to rather violent storms when they come. So far I have had no trouble.

A very roundabout message came to me recently from Lindsay, VK4ALM, ex VK4AAL, at Rockhampton, stating he had received a message from Geoff VK3AMK who in turn had received a message from Neil VK8ZCU to the effect that Neil had been hearing, but not necessarily working, the following call areas on 6 metres from Darwin during October: VU, VS6, KH6, UA, ZL, JA, JR, HL9, P29 as well as VK. That's not a bad coverage of the northern areas, may their signals reach further south.

Mike VK2AM (worked here on 6 metres) mentions considerable 2 metre activity on SSB in Sydney, and with Kerry ex-VK5SU now residing at Moree in northern N.S.W. hammering away at them on VHF there is a possibility some Sydney aerials may be turned north to work Kerry and Barry VK2ZAY at Bogabri, and in so doing meet head on with some of those similar signals emanating from Brisbane. It's only a matter of time boys!

The ZL boys also will be pleased to know their six metre beacon is being heard consistently in VK5, so it does cover some country. Noticed also recently during a long ZL opening on 6 metres that Bill ZL3QK was getting a rather rough time from the hordes of VK stations all wanting to work him; he seemed to be sitting about 52.050 for hours!

Noticed my old friend Col VK7LZ on 6 metres recently. Col writes the HF notes for "Q.R.M." and judging by the formidable list of stations he contacts he must be very busy on HF. However, when the DX comes along on 6 we are always happy to welcome Col back to our ranks. Still an excellent signal from you Col.

Daniel VK7ZDA is still looking for wind operated equipment for his new location, so he must be well up in the clouds. Noted also from "Q.R.M." that Daniel has now resurrected his 432 MHz transverter, after dropping a hammer upon it, is now able to get into Oscar with 1 watt. In Hobart we note VK7AZ and VK7AK have purchased 432 MHz rigs, mainly to work through Oscar.

Further upsurges in VHF activity are reported in the "Geelong Amateur Radio and TV Club Newsletter" with Peter VK3AWY and Dennis VK3ZKH having 6 and 2 metre transverters; Charlie VK3ZSG uses his FT200 to drive a 2 metre transverter, with full power to a YL1060. Also active is Mike VK3ASQ with a YL1060 for both 6 and 2 metres, while Alan VK3LW has purchased one of those "handbag radios", an IC202; so has Trevor VK3AZR. With all this going on in Geelong, surely there has to be a total upsurge in 2 metre contacts across the continent before long.

The "West Australian VHF Group Bulletin" mentions an increase in activity in Kalgoorlie, with the repeater on channel 8 with a range up to 25 miles. VK6ZQR, VK6OI and VK6BV are all on 6 metres. Lew VK6ZSG is working on a 432 MHz transmitter which is nearly completed.

It is probably relevant to bring to your notice some lines from the "Eastern Zone News from VK3 Bulletin" under the heading of SAFETY. I quote: "Several towers have come down of their own accord around the eastern zone lately. Two wind-up towers have unwound themselves and another collapsed three days after erection, luckily no serious damage was sustained. Perhaps it is time careful consideration was given to all aspects of aerial installation. An aerial with a gain of 25 dB at 60 feet only has a fraction of this gain when bent into a U shape at ground level. Fittings exposed to the weather for long periods inevitably deteriorate without regular maintenance and galvanised wire does not last forever. Pay careful attention to the winch on your wind-up tower. Do not assume that the pawl is engaged because it clicks away merrily while the tower is being wound up. Ease off the winch handle slowly to make sure that it is engaged, and preferably use some additional means of locking the winch before letting the handle go." Very good advice, and may I add a couple more things. Always use thimbles for attaching your guy wires to the mast, these do not wear away like the wires do when tied directly at the anchor point. If using turnbuckles always run a piece of plain wire through the closed section to prevent it from unwinding, which it will certainly do long before it rusts up. To prevent turnbuckles, various nuts and bolts and other mounting hardware from rusting, I coat all such items with cold galvanising paint before hoisting in the air. Years afterwards you can undo every nut and bolt as this paint properly applied has a life of 20 years or more. Do the job properly, and that means do the painting before the rust sets in. And despite what the purists might say, araldite is still a good compound for sealing off the ends of your foam and other types of coaxial cable to prevent the ingress of water. I use it even at

432 MHz and I can't notice any loss in performance, but I do know my coax isn't worried by the entry of water, and is mechanically strengthened at the same time.

EME REPORT

From Lyle VK2ALU through "The Propogator". He reports no EME test schedule was received for October, possibly delayed in post.

"The eclipse of the sun on 23/10 provided a unique opportunity for VK2AMW to carry out experiments to obtain information on:

(i) the diameter of the 'radio' sun at 70 cm.

(ii) the proportion of its energy at 70 cm radiated from the corona.

(iii) effects of the eclipse on properties of the ionosphere, specifically related to rotation of polarisation of signals.

"Preliminary results of experiments indicate that (1) the 'radio' sun at 70 cm is appreciably greater in diameter than the 'optical' sun, and (2) the corona generates a considerable percentage of the RF energy emanating from the sun at 70 cm.

"A chart record and numerical results were obtained and are being evaluated. They may modify our antenna beamwidth pattern, obtained by using the sun as a ½ degree diameter noise source.

"The most unusual part of the experiments was in obtaining echoes of our transmitted signal back from the moon when it was directly in front of the ... Rotation of the polarisation of the reflected signal during its passage through the ionosphere was not significantly affected by the eclipse at this location, possibly due to the effect of the residual solar energy from the 6% of the disc still visible and from the corona.

"Club members VK2ZVX, VK2ZHU and VK2APG assisted VK2ALU during the experiments. Two visitors, including Japanese amateur JA3SVG (MM operator) were also present."

I would like to add a word to that above and say that, as mentioned last month, I was able to observe the total eclipse in the south-east of S.A., and even with the merest chink of the sun visible before total eclipse, the earth is still bathed in ample quantities of sunlight. The great shadow cast by the moon raced across the earth at supersonic speed, and when totality occurred, it was just like turning off the light switch to provide a twilight situation. The same occurred when the sun emerged from totality. The merest chink again bathed the earth in bright sunlight, indicating the enormous power of this radiating body. On this basis, the effect on the rotation of polarisation mentioned by Lyle above, would not be greatly affected because there is still a vast amount of light and energy being radiated from a minute part of the sun's surface.

VK2 VHF FIELD DAY

Athol VK2BAD, VHF and TV Group President in VK2, has sent me a copy of the rules and scoring e for the VK2 Mid-Summer Field Day Contest to be held on the Australia Day long weekend, s'arting 0100Z on Saturday, 29/1/77, and finishing 0300Z on Monday, 31/1/77. For further information you are referred to the "Contests" section of this issue.

While on the subject of Field Days, I sometimes wonder whether people really want others to know that they are holding a VHF Field Day. Scheduled for 4th and 5th December (these notes are prepared in November) are contests and field days in New Zealand and VK5. I see also from the VK6 VHF Group News Bulletin that one is scheduled in VK6 for the same period. Now, prior advice of this to me would have ensured publicity for it. The opportunity is available to publicity officers of the various Clubs to advise me in time, and you can be sure of a mention in these columns, but do remember, copy needs to be in my hands by 25th of the month, e.g. if you want something to appear in, say, the March, 1977, issue of AR, then I need to have the copy no later than 25th January, and so on. The delay is unavoidable, as preparation and printing takes a lot of time, and remember, most of AR is done on a voluntary basis.

Back on to contests once again for a moment. I note in September issue of "Break In" that the New Zealanders are also having a DX Field Day weekend on the same days as the VK2 Field Day. All VHF and UHF bands are to be used, the periods of operation being 29/1/77 0400 to 1000Z, and 1800 to 2400Z. If you can work into ZL on any bands above 1300 MHz you could earn yourself 500 points too!!

When you read this it will be 1977. May it be a happy and prosperous year for you all, despite the inevitable strikes. Closing with the thought for the month: "Fun is like life insurance; the older you get, the more it costs."

73. The Voice in the Hills. ■

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

LET'S HAVE AN OFFICIAL WIA POLICY ON CB LEGISLATION

The Editor,
Dear Sir,

The topic of CB licencing or legalisation in Australia is becoming a little monotonous and nauseating to amateurs like myself. I believe that this subject must have provoked the greatest amount of public interest and controversy for many years. To the average amateur and CB'er, the issues are a great deal more important than deciding which Medibank cover is best . . . or whether daylight saving should be retained. A subject as colourful as CB radio has captured the imagination of most members of the thinking public, due almost entirely to a media that obviously has a leaning towards the "under-dog" CB-er.

Full marks must go to the public relations boys of CB. No matter how they have achieved it, they have done a terrific job, to the point that the general public envisages the Licenced Amateur (Ham . . . shudder) as the protagonist who is bent on depriving the public of the much needed facility of CB radio. What a devastating situation to have let develop right under our noses!

The battle for legalisation of CB has been continuously depicted as a two-sided one, the contestants being on one side the goodies, CB operators, pursuing their innocent, almost angelic public service hobby, whilst on the other side we have a **combined effort** by the Amateurs and the Telecommunications and Licencing Branch (PMG). What an unpopular running mate we have. No wonder, with the biased media the Amateurs are loosing public support.

Surely it's time that we the Licenced Amateurs, through the WIA, came out in the public press with our policy. This policy should be made quite clear and with no ambiguous or half statements. It should be made very clear that our policy, whatever it may be, is not influenced by either public demand or duty-bound allegiance to our "running mate", the PMG. It is most important that we have a mind of our own . . . and the public must be made aware of it, even if it costs us hard cash in paid announcements.

APART FROM ONE OR TWO VERY SMALL REFERENCES, I PERSONALLY HAVE NEITHER READ NOR SEEN **ANY** CASE IN THE MEDIA TO HELP THE PUBLIC IN MAKING A FAIR ASSESSMENT OF THE CB SITUATION.

I won't bother to compare this meagre Amateur effort to the tonnage of pro-CB articles that are appearing like mushrooms. Most thinking amateurs have their own opinions regarding licencing CB.

Whilst the thought of hordes of mostly non-technical operators being allowed on the air without the need of any form of examination does irk me, I do feel we are only kidding ourselves if we believe CB will go away if it is not licenced. Whether we like it or not we have knowingly let the situation worsen by not pushing hard enough to have stopped the import of potentially illegal equipment into Australia. We are now stuck with the problem and have to cope, with the same logic as exists with other unsavoury products of modern technological living. As in the case of pollution, traffic congestion, and chimney stacks, we have to learn to live with them and try to minimise the bad by-products by sensible control.

In my opinion sensible control (licencing) of CB radio falls into the same category. Let's push to have legislation approved, collect licence fees, and at least know that there is some form of control.

Let's make a noise — not on the air but in the media.

Sid Ward VK2SW.

The Editor,
Amateur Radio,
Dear Sir,

I would like to comment on an article in October AR called "Fixed Wire Beams".

In the article, the feed point impedance is quoted as 75 ohms, when in actual fact it is 300 ohms (as in a folded dipole).

As a suggestion for low power, 300 ohm TV ribbon serves as a folded dipole, and can be terminated in the usual way with a quarter wavelength of TV ribbon.

I hope these observations may be of some help.

Harry VK3PX.

The Editor,
Dear Sir,

I was perturbed, but not really surprised, to read in the "WIANEWS" section of November AR that there had been a proposal that the VK/ZL/O DX Contest should be "terminated because of the lack of interest in it".

The apparent "lack of interest", if this is judged on the number of local logs submitted, is mainly due to the unwieldy scoring system used. It normally takes almost as long to work out the score as it does to compete in the contest. If a simple multiplier scheme (which is good enough for the other major DX contests) were adopted for local entrants, and the serial numbering started at 001 on each band, then I am sure the number of locally submitted logs would increase. Also, if the amount of publicity and credit given to the contest in AR was similar to that given to the RD and other local "minor league" contests, then the local log submissions would show a different picture.

Is the "lack of interest in it" on the part of the possible contestants or the WIA?

Yours sincerely,

Tubby Vale VK5NO.

The Editor,
Dear Sir,

I am enclosing a copy of an Award which I received recently. Seeing that it is a special ONE-OFF, I thought it would be of interest for publication in AR. (The original is red and blue embossed on white parchment.)

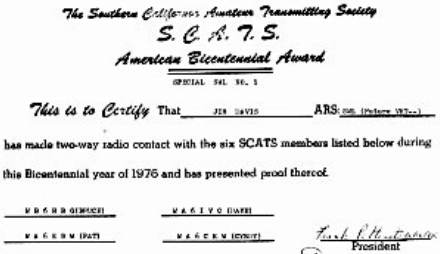
As you can see, it is an award by SCATS to any Ham who makes two-way radio contact with any six of their members. Recently, I was fortunate enough to receive signals on 14 MHz from six of their members and I took the opportunity of sending them a detailed report on their transmissions, plus some pictures of my vintage radio gear. Unfortunately, because I haven't got my "ticket" as yet, I couldn't "hit the switch" and go back to them, so I did the next best thing. I've got a lot of very modern equipment on which I do hours of listening and I also assist the local "Intruder Watch" officer.

Fortunately I've got time to spare to do this, and I am pleased to report that I have now made a positive identification of one Intruder in the middle of the 40m band. This is "Radio Tirana" situated in Belgrade, and operates on 7.065 MHz. I've got an English language session nicely on tape with station identification, anthem and so on.

The report has now been handed on to the authorities.

Hoping the Award is of interest. How many full call hams have got one?

Jim Davis, 163 Gilbert St., Latrobe Tas. 7307.



JOHN MOYLE NATIONAL FIELD DAY CONTEST RULES — 1977

Amateur operators and Short Wave Listeners are invited to make this contest, held in memory of the late John Moyle, a huge success.

Contestants may participate either as individuals or as part of a group. There are two Divisions in this contest. The first one is for 24 hours continuous operation and the second for any continuous period of six hours. Either period must be within the 26 hours available.

CONTEST PERIOD

From 0600 GMT. Feb. 12 to 0800 GMT, Feb. 13, 1977.

OBJECTS

The operators of portable field stations or mobile stations within the VK call areas will endeavour to contact other portable, mobile or fixed stations in VK, ZL, and foreign call areas on all bands.

RULES

1. In each division there are 8 sections.
(a) Portable field station, transmitting phone.
(b) Portable field station, transmitting CW.
(c) Portable field station, transmitting open.
(d) Portable field station, transmitting phone, multiple operation.
(e) Portable field station, transmitting open, multiple operation.
(f) VHF portable field station or mobile station, transmitting.
(g) "Home" transmitting stations.
(h) Receiving portable and mobile stations.

2. In each Division, 24 or 6 hour, the operating period must be continuous.

3. Contestants must operate within the terms of their licence.

4. A portable field station must operate from a power supply which is independent of any permanent installation. The power source must be fully portable, i.e. batteries, motor generators, solar panels, etc.

5. No apparatus may be set up on site more than 24 hours before the contest.

6. All amateur bands may be used, but cross band operation is not permitted.

7. Cross mode is permitted, but note rule 21.

8. All operators of a multi-operator station must be located within approximately an 800 metre diameter circle.

9. Each multi-op transmitter should maintain a separate log for each band. 2 FM rig may be separate from 2 AM or SSB rig, but note rule 11. A separate QSO number series is required for each band.

10. All multi-op logs should be submitted under one callsign.

11. Only one multi-op transmitter may operate on a band at any one time.

12. RS or RST reports should be followed by serial numbers beginning at 001 and increasing by one for each successive contact.

13. **SCORING FOR PORTABLE FIELD STATIONS AND MOBILES.**

Portable field stations and mobiles, outside entrant's call area — 15 points.

Portable field stations and mobiles, within entrant's call area — 10 points.

Home Stations outside entrant's call area — 5 points.

Home stations within entrant's call area — 2 points.

14. **SCORING FOR "HOME" STATIONS.**

Portable field stations and mobiles outside entrants' call area — 15 points.

Portable field stations and mobiles within entrant's call area — 10 points.

15. Portable field stations may contact any other portable field station twice on each band and mode (10-160) during the period of the contest provided that at least 4 hours elapse after the previous contact with that station on that band and mode.

16. Stations may be worked repeatedly on 52 MHz and above providing 2 hours have elapsed since the previous contact on that band and mode. Note that FM, AM, SSB and any other voice modes are grouped together as PHONE.

17. Operation via active repealers or translators is not acceptable for scoring.

18. All logs shall be set out under headings of Date-time in GMT, Band, Emission, Call sign, RST sent, RST received, and Points claimed. List contacts in correct sequence. There must be a front sheet to show — Name, address, division, section, call sign, or call signs of other operators, location, points claimed, equipment used, and power supply. You must also certify that you have operated in accordance with the rules and spirit of the contest.

19. Certificates will be awarded to the highest scorer of each section of the 6 hour and 24 hour divisions. The 6 hour certificates cannot be won by the 24 hour entrants. Additional certificates will be awarded for excellent performance.

20. Entrants in sections a, b, c. d, e, and f must state how power for transmitting is derived.

21. All CW-CW contacts count double. Cross mode contacts do not count double.

22. Entries must be forwarded in time to reach the Contest Manager by 18th March, 1977. The address is — Federal Contest Manager, Box 67, East Melbourne, 3002.

RECEIVING SECTION

This section is open to all short wave listeners in VK call areas. Rules are as for transmitting stations, but logs do not have to show report and serial number of the second station, or station called. Logs must show the call sign of the portable or mobile station heard, the report and serial number sent by that station, and the call sign of the station called. Scoring is as shown in rule 14 for home stations. A station calling CQ does not count. Portable and mobile stations, which must be listed in the left-hand call sign column of your log, alone count for scoring. Stations in the right-hand column may be any station contacted. A certificate will be awarded to the highest scorer of each of the 6 hour and 24 hour divisions, individual or multi-operator entries. Certificates will be issued for excellent performane. ■

AWARDS COLUMN

Brian Austin, VK5CA
P.O. Box 7A, Crafers SA, 5152

AUSTRALIAN DXCC TOP LISTINGS AS AT 23.11.76:

Phone:			
VK6RU	320/352	VK2APK	300/313
VK4KS	320/339	VK4FJ	297/324
VK5MS	313/343	VK4PX	397/304
VK6MK	310$337	VK3JW	294/301
VK3AHO	304$326	VK4AB	291/314
VK4UC	310/306	VK6LK	290/295
CW:			
VK2EO	317/346	VK3XB	280/300
VK3AHQ	308/331	VK3NC	268/297
VK2QL	306/335	VK6RU	267/296
VK3YL	298/321	VK3YD	258/281
VK4FJ	297/329	VK4KX	256/261
VK2APK	291/304	VK3TL	248/260
Open:			
VK4KS	321/345	VK4PX	304/315
VK6RU	320/352	VK4UC	304/310
VK4SD	315/336	VK2SG	301/311
VK2APK	311/329	VK3JW	295/302
VK6MK	310/337	VK3XB	286/306
VK4FJ	309/341	VK4RF	286/303

DXCC NEW MEMBERS SINCE 14.3.76:

Phone:	
VK3WT	Tally 109
VK7CL	156
VK4VU	227
VK3DF	109
VK1AOP	113
CW:	
VK2YB	Tally 112
Open:	
VK3AUL	Tally 101
VK4AK	261
VK2AFG	103
VK1AOP	117

ALTERATIONS TO SCORES (EXCLUDING TOP 12 AND NEW MEMBERS:

	Phone	CW	Open
VK8CW	220/224		
VK5RX	143/143	213/226	238/251
VK6HE	132/134		
VK20W	145/145	149/159	214/224
VK4EZ			120/124
VK4CZ	254/258		
VK4DO	254/271	201/223	262/286

OVERSEAS MAGAZINE SUBSCRIPTIONS

As the result of devaluation of the Australian dollar the following are the provisional rates effective at once for overseas subscriptions orders processed on behalf of WIA members —

$A.	1 yr.	2 yrs.	3 yrs.
QST	9.80	19.60	29.40
73	10.00	—	19.40
CQ	8.00	13.80	—
Ham Radio	9.70	—	20.00
Radio Communication*	12.30	—	—
CQ-TV*	4.50	—	—
Break-In	7.00	—	—
VHF Communications	6.00 (Air Mail 8.00)		

MAGPUBS

A Service to members
P.O. Box 150, Toorak, Vic., 3142

CHESS VIA AMATEUR RADIO

Albert (Simon) Templar VK1AF
C/- BPC, Ocean Island

Last June a chess tournament was held between four players on Ocean Island and four players on Christmas Island and below is a brief account of the whole setup.

The idea was originally brought up by Kevin VK9XK during a regular sked. During the discussion that followed a number of points were brought up:—

Method of Notation
Time of Moves
No. of Games
Propagation

It was decided that Ocean Island would play White in the 1st and 3rd games, with 4 games played simultaneously being the maximum we thought we could handle.

The time for moves was decided at 5 mins. 12 moves per hour approximately.

Propagation was checked over a few Sundays and found that 0530 to 0800 GMT gave us a good workable Signal.

NOTATION

A look through a chess book showed two methods used. The universal method is the one that we used.

The matter of players came up next and Kevin VK9XK had no problems, there was in fact too many players who answered the call to arms, broadcast over the local radio station.

On Ocean Island I had not so much luck, there being only about 8-9 people who knew how to play chess, some were just going on leave and to boil it down, the final list of 4 players changed 3 times before the Big Day.

With the final check on propagation the Big Day was set for Sunday the 13-6-76 and the following arrangements were made at Ocean Island.

4 surrounds were made from white wrapping paper to place under Chess Boards for easy reference of Notation. i.e. D2 — D4, etc.

A check sheet was made up for each game.

GAME No. 1

Moves No.	Ocean Island (White) Russell Harding	Xmas Island (Black) Meg Turkin
1		
2		
3		
etc.		

At Ocean the contestants were set up in what is called a "Maneaba" (a native meeting house), which is basically a thatch roof of pandanus leaves, supported by uprights (no walls), with a small card table, chess set, stubby holder (of course), and a pen with check sheet.

The Maneaba belonged to Dr Ron Plachy, one of the Ocean Island contestants and neighbour to VR1AF.

The final teams were:

	Ocean		Christmas
Game 1	Russell Harding	v	Meg Turkin
Game 2	Ron Plachy	v	Stuart Wills
Game 3	Jim Allen	v	Jeff Deale
Game 4	Nick Wardrop	v	Gareth Thomas

Also the services of 4 youngsters to run the check sheet between the Maneaba and the radio shack was sought.

Both my XYL Joan and also Betty Plachy offered to provide refreshments and snacks during the Tournament.

At Christmas Island the Tournament was to be held at the Amateur Radio Club Station VK9XI followed by a bar-b-que.

At Zero hour, everything went smoothly

for the first few moves, and it was realized that notation numbering was not as should be, 15 minutes of sorting out solved the problem, and from then on all was plain sailing.

The first game went to Ron Plachy on Ocean Island in 12 moves, a very fine effort. The next to Russell Harding in 22 moves, both players having a short chat with their opponents between move information for the continuing 2 games Nos. 3, 4.

At 1030Z, the band became unusable with games 3 and 4 still running, but a very good afternoon was had by all.

A quick exchange of information organized continuance of the remaining games in a week hence.

On the 20-6-76 at 0530 GMT contact was quickly established but the evening was uneventful with both games still running and was terminated at 0900 with the band closing down. Once again we were to continue the following week.

Contact was not established until 0600Z, and it was decided by all that this was to be the last day, and that five minute rules would have to be enforced.

This made a noticeable difference to the play and at 0740 Jim Allen stalemated with Jeff Deale and spent a few words discussing it on air.

The game had taken 51 moves to stalemate. The 4th game finished at 0800Z with Nick Wardrop victorious in 54 moves.

The end result was 3 wins to Ocean and 1 draw.

In conclusion, a good time was had by all, but it was felt that 3 days was too long, and that shorter move times and one session would be more enjoyable.

A comment to add here may be appropriate as put forward by Don Reed VK2ADR, "Was this an Amateur Radio first?" — Chess between the Indian and Pacific Oceans, via Amateur Radio — I wonder!!

P.S. There is also a Pacific D.X. Net. normally on Tues. and Fridays 0600 GMT 14.265. ■

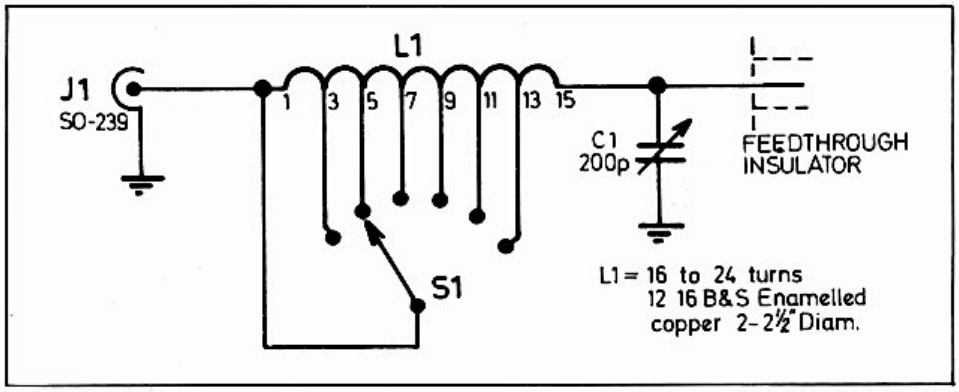
NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG
David Down, VK5HP

A TUNING UNIT FOR RANDOM LENGTH WIRE ANTENNAS

This simple tuner will cover 80 thru 10 metres and depending on the spacing between the capacitor plates, up to 300 watts will be catered for. The tuner therefore lends itself for Novice and high power transmissions over the HF spectrum.

The tuner is housed in a metal box, about 6 x 5 x 4 inches. C1 and S1 are mounted 1¼ inches above the bottom of the box. Ensure that C1 is adequately supported front and rear. To have large components front-mounted only, is a bad constructional practice to adopt, and in other types of equipment, such as VFOs, can lead to mechanical instability.



L1 is wound with every alternate turn indented. Position L1 so the indentations face up and to the front. L1 is mounted ½ inch from the rear and bottom of the box and is supported by its own leads — one to J1 and the other to the feedthrough insulator.

S1 is a rotary shorting switch and should be mounted so the 3 contacts closest to the front panel face C1. The wiper contact should face the bottom of the box. Connect the lugs on S1 to C1 and J1 *prior* to wiring to L1.

When wiring to the taps on L1, start at the end nearest C1 to minimise the hazard of shorting.

Use 18 SWG wire and solder to the taps, beginning at the 15th *raised* tap, then working back to the 3rd *raised* tap. After all necessary drilling is done and positioning of components is checked, one or two coats of spray enamel (your colour choice) and 4 rubber feet glued to the base of the box will greatly enhance its appearance.

S1 and C1 may be carefully labelled at the front panel, freehand with ink, with Dymotape or with Letraset (depending on your financial resources) to round off a nice finish.

C1 minimum capacitance is marked 0, and S1 is marked 0 where all contacts are shorted (full anti-clockwise). With C1 and L1 set to 0 (L1 via S1) the transmitter will see the antenna as if the tuner did not exist.

For optimum results, your antenna should be a multiple of wavelength or quarter wavelength (see Newcomers Notebook July 1975). Connect the transmitter output to J1. Set C1 and L1 to 0 and tune the transmitter. Adjust S1 for maximum RF output, then C1 for peak output. After C1 is adjusted, try the next S1 position — usually a couple of tries will be sufficient. Mark the settings for each band on a card, and attach this neatly to the front panel for ready reference. This will save time in bandchanging later.

Best of luck to all those undertaking the various courses around the country, and we hope you are all soon successful at an examination so you can *legally* start producing RF from the shack.

73 till next month,

Rodney VK3UG and David VK5HP/QRP. ■

COMMERCIAL KINKS

Ron Fisher, VK3OM
3 Fairview Ave.,
Glen Waverley, 3150

Unfortunately I have not been able to complete my proposed changes to the Realistic AX-190, so these will have to be carried over to next month. However the work so far completed looks promising. Don't forget if you have any ideas on modifications that you have either carried out or intend to carry out, please let me know. For this month we return to the FT101 but this time the "E" model. Daryl Manley VK3AMJ discovered the cure to a built-in fault in his 101E.

The transceiver had operated for the last twelve months both mobile and in the shack, and I had been very pleased with its performance; so it came as a surprise when a report of hum on the signal was received. Tests carried out with a local station confirmed the problem. The hum, which was at approximately 100 Hz, appeared to decrease when modulating the transceiver and built up after I stopped speaking.

My first reaction was to suspect a problem in the power supply, but a check of all the filter components proved nothing. Tracing the problem further, it appeared that the hum was getting into the balanced modulator and producing output from this stage. This seemed logical as the hum was noticed more by local stations than by distant ones.

It was felt that the fault was associated with the microphone amplifier or balanced modulator stage. A quick way to prove this was to replace the plug in modules with others from another 101, however the trouble continued. The next step was to disconnect the audio stage from the balanced modulator. This was easily achieved by disconnecting the link between pin 8 of the MIC amplifier board and pin 9 of the modulator/oscillator board.

Using a separate monitor receiver in the shack, further tests confirmed that with the MIC stage disconnected there was no hum on the monitor receiver. On reconnecting this stage it was found that the hum level altered with the setting of the MIC GAIN control but in reverse proportion to the setting of the control. At this point it

became obvious that the hum was being produced by an earth loop around the MIC stage. The MIC amplifier stage is earthed in two places, pin 1 and pin 6. They are earthed at the connectors with a short piece of wire directly to the chassis. But also from pin 1 is a connection to earth at the final cage. Removing this extra earth lead cleared up practically all the hum proving the earth loop theory. A further reduction in the small amount of remaining hum was achieved by joining the two earth rails in as many places as possible on the board and by insulating the top mounting screw from the earth on the board.

Following these modifications, reports indicate no hum on the transmission. Daryl's work in tracking down this hum should be of interest to all of those who are fussy about the quality of the signal they put out. I think that this same trouble occurs in many other types of transceivers perhaps to a similar extent. Maybe the method of tracking the problem down could be applied to your rig. Check with a local and see if your signal is clean. ■

WICEN IN ACTION

The Wagga WICEN Group are now drying out and recuperating after mounting a major communications operation during the recent serious floods which threatenend to inundate the City of Wagga Wagga and the town of Narrandera.

Regional WICEN Co-ordinator Sid Ward VK2SW and Deputy Co-ordinator Doug Menneke VK2ZMP alerted WICEN on Sunday, 17th October, 1976, and became operational on Monday, 18th.

Three self-contained 2-man WICEN teams were stationed at selected gauging stations well up river from Wagga from Monday morning continuously until Thursday afternoon and another team was stationed about 15 miles downstream.

Regular hourly and half-hourly readings and other data was passed via the Channel 3 Wagga Repeater direct into a WICEN station in the Divisional headquarters of the State Emergency Services in Wagga.

This continuously available data permitted accurate estimates of the maximum river height, which contributed to the peace of mind of the City's inhabitants and were of great value to the workforce constructing sandbag levees.

In addition the Wagga WICEN Group provided mobile and flood boat 2 metre Simplex communications for the Police Volunteer Rescue Group and from the flooded areas of the City back to another WICEN station at SES Divisional headquarters.

Simultaneoulsy, at Narrandera some 65 miles downstream, Harry Cuthbert VK2AEC was monitoring the Wagga river heights on the Wagga Repeater and relaying to the Narrandera SES authorities and passing direct to Wagga the river height data from Narrandera.

At the time of writing the flood peak was approaching Narrandera and Harry still had several days of hard work ahead of him. The Wagga WICEN Group were very fully supported by every member of the Wagga Wagga Radio Club who could assist, plus many of the YL's and XYL's, and Harry was backed by a number of the Narrandera Amateurs and very ably by Mrs. Cuthbert.

The Wagga and Narrandera WICEN-ers provided a 100% emergency communications service of which they can be proud and they can also take pride in the reliability of their Repeater, which never missed a beat throughout the whole operation.

Congratulations to them and thanks for a job well done and it is trusted that the statutory bodies who benefited so greatly will express their appreciation and thanks when compiling their official reports.

Howard Freeman VK2NL,
VK2 State WICEN Co-ordinator. ■

IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP

1976 comes to a conclusion on a very uncertain note. It appears we have still not reached rock bottom of Cycle 20 and there is no positive indication that Cycle 21 is really getting into gear. There was evidence of the new Cycle activity during the past twelve months but not enough to sustain activity beyond a few days.

The experts are still cautious with their predictions and all scientific evidence still appears to be based on declining Cycle 20 material. The appearance of the new cycle spots and their resultant higher activity level are providing the devotees of their own exclusive bands, plenty of DX, particularly on 21 and 28 MHz. There has been ample evidence of just slightly higher than average solar flux figures, of increased propagation quality. Incidentally WWV at 18 minutes past the hour are still giving Solar Flux and A index readings for the previous GMT day, along with the K index for the current GMT day at a nominated hour. Despite many arguments this K index and the state of the geomagnetic field provide valuable information if you are prepared to keep records daily.

The two indices available currently show the sunspot running smoothed number tending to even out early in 1977. Predicted numbers at Sept 30th, 1976, are Oct 76 — 9, Nov 76 — 7, Dec 76 — 6, Jan 77 — 5, Feb 77 — 5, Mar 77 — 5.

The average predicted minimum was 5. Dare we hold our breath and hope that mid 1977 will see the long awaited climb towards the next maxima.

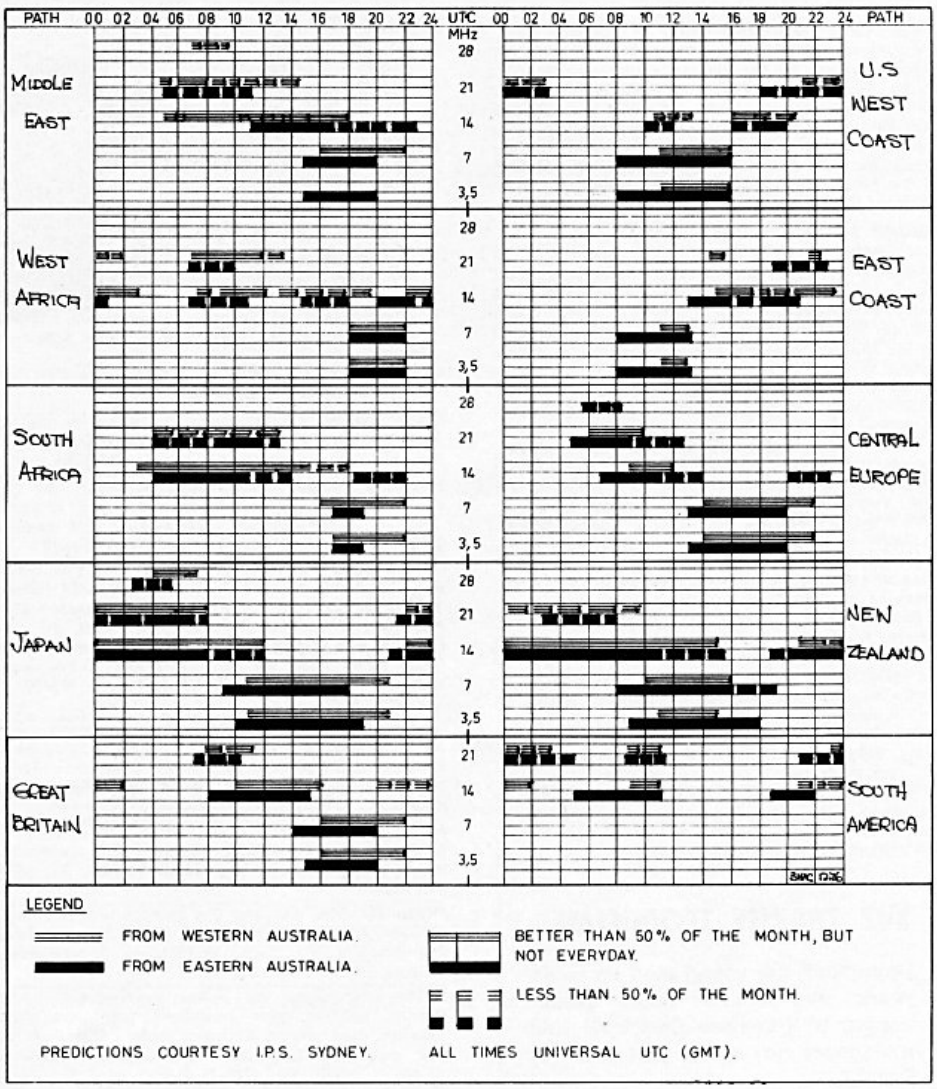
Looking across to the Solar Flux predictions, the latest available forecasts show —

Dec 76 — 87, Jan 77 — 97, Feb 77— 105, Mar 77 — 111, Apr 77 — 116, May 77 — 122.

Predictions for Nov 76 of 78 look like reaching this figure at the time of writing (late Nov). For Dec 76 it is quoted as 87. These of course are monthly means and the daily figures vary with solar activity.

Other parameters exercise considerable influence over our ionosphere and the average amateur is not in the position to correlate available data with any speed. With the ionosphere varying at all times, 100% accurate predictions are difficult — if not impossible to make. Probably the best predictors are amateurs, using their bands at all times. Not just listening to noises, but making noises. It's marvellous how a two-way QSO across town can open an otherwise dead band.

Using the charts as a guide to path openings call CQ and test the propagation — try long and short path. Often you will be surprised, sometimes from the only one on the band and VKs are often in short supply. Remember receivers never worked DX.



When Oscar 8 orbits, we probably will not require prediction charts — only orbit times — just think of the QRM? 73's. Best DX for 1977.
VK3ZGP/3NAC. ■

IARU NEWS

As quoted in the "editorial" in QST for Sept 1976, Ambassador Armin Meyer, W3ACE, had this to say about his month's safari in the Middle East:

"In Cairo, dining on the banks of the Nile with one of our fellow amateurs, I learned that the greatest barrier to more widespread amateur activity in Egypt is the shortage of foreign exchange which is necessary to purchase the equipment so readily available to Americans and other amateurs. In Saudi Arabia and Iran, money is not a problem, but there remain certain psychological barriers which tend to restrict the number of licences issued, expatriates often being considered safer than local nationals.

Totally unrecognised is the tremendous capability which amateur radio has for training the technicians so critically required to man the vast development programs being launched by those countries.

The same is true in Iraq, where I was emphatically told that amateur radio is strictly and unequivocably forbidden. Particularly tragic is the situation in Lebanon. Torn by unbelievable civil strife, the very survival of the country is at stake. Amateur radio, which once thrived in what was considered to be the Switzerland of the Middle East, is among the casualties."

It might perhaps be added here that the shortage of foreign exchange also affects several countries in Region 3, particularly India.

But there are other national considerations which also inhibit the development of amateur radio in many of the poorer countries. One, of course, is the cost of amateur equipment coupled with lack of exposure to the art and pre-occupation with simpler and more readily accessible forms of activity such as football and various tribal or group events. Even the simple act of listening to the local broadcast station is beyond the reach of many except on a communal basis.

REGION 3 ASSOCIATION

The Directors of R3 and the Secretary met in Singapore on 11th/12th September last to discuss the activities of the Association since the 3rd Regional Conference held in Tokyo in March, 1975, and to plan ahead for the 4th Conference and WARC 79. The financial position was strong thanks largely to the very generous and practical support of JARL which had also undertaken the burden of producing the regular editions of the Region III News.

The principal item on the agenda was consideration of the content and format of model position papers for the use of Societies in approaching their own Administrations. The results would be distributed to Societies and other interested parties as early as possible.

Another item discussed was an update of the rules and regulations of the Association for circulation to member Societies for comments.

The Directors decided to budget to send two people from the Association to Geneva during WARC 79 with the intention that they form part of the IARU team. The meeting noted with disappointment the lack of response to Intruder Watch in the Region.

The Directors attending the meeting were Dr. Samy Saito, JH3PJE, Mr. Michael Owen, VK3KI, Mr. Tom Clarkson, ZL2AZ, and Mr. Tan Lian Huat, 9V10D, with Mr. David Rankin, 9V1RH/VK3QV, as Secretary. Observers joined the executive group from time to time including Mr. Frank Aw, 9V10K, and Brig Ramchai Chotikul, HS1WR. ■

INTRUDER WATCH

Alf Chandler, VK3LC

1536 High Street, Glen Iris, 3146

An article in the "Age" of Friday, 19th November, 1976, entitled "Triumph of Terrorism", by the Hon. Don Chipp, seems to me to be relevant to Amateur Radio in view of the forthcoming World Administrative Radio Conference in 1979.

He says, and I quote — "With the naivete that peculiarly belongs to the stupid, I keenly anticipated the Madrid meeting. I was bitterly disappointed . . . For three days I sat there and heard an unimaginable series of platitudes, hypocrisies and drivel . . . In any International Conference today the Afro-Asian-Arab Bloc can virtually control the agenda and the resolutions . . . This new majority is now using its muscle in the world's international forums ruthlessly and vigorously. The incongruity is that by destroying the efficacy of the system they will suffer most." — Unquote.

How apt this will be if something isn't done to educate and persuade this same "Afro-Asian-Arab Bloc" to recognize and foster Amateur Radio!! One way is to keep observing infringements of Commercials into our bands, and reporting them to the Intruder Watch Co-ordinators. As the bands open up again you can be assured that there will be many more intrusions than at present. Happy New Year. ■

HAMADS

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- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

FOR SALE

Clegg FM 27 145-147, fully tunable with mobile mount, mike, manual. Recently serviced by distributor. $200. VK2BOA, QTHR. Ph. (049) 61-1580.

Handheld Tempo KP202 (same as Ken) with repeater channel 2, 6, 8 and two US Simplex channels. Nicad charger, short antenna and manual. $100. VK2BOA, QTHR. Ph. (049) 61-1580.

Uniden 2020. $510. Matching ext. VFO $75, spkr. unit $30, the lot $585. Atlas 210X with Shure 404C mic. $585; KP12A RF Speech Processor $80; Asahi centre eloaded HF mobile antenna set and bumper mount $100; AL48DXN trap dipole with RAIC balun $38. All above as new, little used. VK3ARZ, 769 High St. Road, Glen Waverley, 232 9492 A.H.

Drake Rx Model SPR-4 Communications and Amateur crystals for AM-USB-LSB-CW, double conversion, dual voltage; excellent condition. Half-price ($450). Jim Dunne, 99 Studley Park Road, Kew 3101. Ph. (03) 86 8641.

FT2FB, FM, 2m, transceiver. Ch. 40, 50, 2, 3, 4, 5, 6, 7 and 8. Two mobile mounts, mic., handbook, all in good order. $140. VK2BJK, QTHR. Ph. (02) 449 1598.

FT220 2M SSB, FM and CW transceiver. As new, had very little use. With extra crystal for repeaters, 240 AC 12V DC. $435. VK3BH, 35 Ropley Ave., Balwyn. Ph. (03) 80 1204.

FT200 with Yaesu AC power supply/speaker, 18 months old, in mint condition; just completely checked over and in A1 going order. Operated on CW only, no SSB unit required. $350, O.N.O VK4AUT, QTHR. Ph. (02) 76 9143.

BS50 Base station, fitted channels for 2m RTTY, 40, 50, Rpt. 2, 4 and 8; Mod. 15 Teleprinter; TMC solid state terminal unit and AWA demodulator. $350. HRO C/W all coil boxes — best offer. VK3YJI. Ph. (051) 56 8311.

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. L. H. DUNCAN	**VK5AX**
Mr. F. H. BULL	**VK2AJM**
Mr. D. E. VAUGHAN	**VK2FY**
Mr. R. J. EVERINGHAM	**VK6BO**
Mr. N. MARTINSON	**VK6NM**

From Estate of the late F. Bull VK2AJM. Univeka multimeter, 52 ranges, $70. Oskerbloc SWR 200 power meter, $40. Omega T noise bridge, model TE7-01, $20. VK2AJL, QTHR. Ph. (02) 41 7729.

Swan 240 transceiver 80-40-20 m. C/W matching power supply, mike and instruction book, unit in immaculate condition and works perfectly, $200 firm. VK2MR, QTHR. Ph. (02) 529 5857.

SSTV Monitor Robot model 70A, as new, in box, $390, or swap FTDX400, FTDX560 or FTDX401. VK2ZHF, 17 Orange St., Pendle Hill 2145. Ph. (02) 631 1269.

Kenwood TS510 Transceiver and power supply in excellent condition, still as original with no mods, has just been retubed and realigned and gives excellent performance and has particularly good Rx characteristics under strong adjacent signal interference. Updating to TS820 and desire quick sale for $275. VK3CDX, QTHR. Ph. (03) 877 1135.

Uniden 2020 Transceiver 80-10 m. with AC/DC power supply, phase-locked loop, etc. Am off air at this location so virtually unused, re-checked O.K. by agents. Any reasonable offer. VK2KR, QTHR. Ph. (02) 449 4524.

2 metre 5-element beam with mast and tilt-over top for horizontal/vertical polarisation, $20; 10 m to 160 m vertical, portable with nylon guys as per AR Oct. 1971, $40; Pye Ranger, 1 original and 1 converted to 2 m. 5 ch. $40 each. A. G. Holden, 25 Warrick St., Ascot Vale 3032.

Trio All Band SSB transceiver TS510, ex. condition, ex VK3MM, $300. New electronic workshop practical exercise kit, new components for novice Tx and other useful items, $75. Ph. (03) 844 3222.

Urgent Shack Cleanout (moving QTH): Hy-Gain 204BA with BN86 balun, $145; AR2X Ringo 2 Mx vertical, $30; Ken KP202, charger, heli whip and steel ¼ wave, 2 sets nicads, repts 2 and 8, simplex 40, 50, $150; FT75B TXCR 80-10 Mx, AC and DC PSU's, FV50C VFO (3 xtals 80, 40, choice of 7 for 20 Mx, 1 each on 15 and 10), $350. All above gear in excellent condition. Enquiries B. Bathols, VK3UV, 6 Ann Court, Aspendale. Ph. (03) 90 6424 A.H.

WANTED

Keen Students; Amateur and Novice courses Box Hill Technical College start Feb., 1977. ... 89 0231 now and register your name with Grame VK3ZR or Ken Dobson.

FV401 External VFO Unit for FTDX401. VK4RF, QTHR.

2m Linear Suit EME. VK3YJI. Ph. (051) 56 8311.

Series 60 coaxial relay, 48 volt, Type N. Two wanted. VK3KW, 3 Rose St., Essendon. Ph. (03) 379 1152.

Type 3, Mk. II and/or Type A, Mk. 3 equipment, complete. VK7ZW, 2 Drew St., Devonport East. Ph. (004) 27 8808.

National HRO or AWA AMR100 (not A27) receivers, complete, or parts for restoration project, dials, tuning capacitors, coils, meters, etc. VK2PW, QTHR. Ph. (02) 807 6725.

Power Transformer or complete P.S. suit 2 x 813 linear. Price and particulars J. Moyle VK4ZT, QTHR.

2m FM Rx, solid state physically small size. VK3AFI, QTHR. Ph. (052) 21 3658 A.H.

Yaesu FTV650B, FTV250B, FT101E. Bob. Ph. (02) 646 0426 Bus., (02) 46 3727 A.H.

STOLEN EQUIPMENT

Multi-7 2m transceiver, serial No. 68075, has broken microphone case. Taken from car parked at Beecroft. VK2BLB, QTHR. Ph. (02) 84 2405.

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TRIO KENWOOD model TS-820—expected shortly.

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YAUSU MUSEN FR6-7. Uses Wadley loop principal

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TH3MK3 10-15-20 M 3-element Yagi 14′ boom
TH6DXX 10-15-20 M 6-element Yagi 24′ boom
TIGER ARRAY 204 BA 20 M 4-element 26′ boom
BN-86 balun

ASAHI MOBILE ANTENNAS

AS-2-DW-E ¼ wave 2 M mobile whip
AS-WW ⅝ wave 2 M mobile whip
AS-GM gutter clip mount with cable and connectors
M-Ring body mount and cap

CUSH CRAFT ANTENNAS

AR-2X Ringo Ranger double ⅝ vertical for 2 M
A147-11 11-element 2 M Yagi
A147-20 combination horizontal vertical 2 M
A144-20 combination Yagi with matching harness for circular polarization

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Model CDR Ham-II for all hf beams except 40 M
Model CDR AR-22 L junior rotator for small beams
KEN model KR-400 for all medium-size hf beams with internal disc brake
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DRAKE TV-3300 TVI low pass filter
DRAKE TV-42 TVI low pass filter, low power
DRAKE MN-2000 matching network
DRAKE MN-4 low power ant. tuner

All prices quoted are net SYDNEY, N.S.W., on cash-with-order basis, sales tax included in all cases, but subject to changes without prior notice. ALL-RISK INSURANCE from now on free with all orders over $100; small orders add 50c for insurance. Allow for freight, postage or carriage; excess remitted will be refunded. For prompt and economical despatch we use ANSETT air freight and COMET road service.

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